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Test Piece

ALL who are to be concerned with the forthcoming Air Exercises and Naval manœuvres are doubtless looking forward to their commencement next month. With each year that passes, such exercises assume greater importance to the Services in providing the *raison d'être* for the many localized training efforts of the intervening months. The suspense, action and keen competition add a stimulus and inspiration which is lacking in routine training, and it is only by full-scale exercises that some sections of the organization can be properly tested. This is particularly true of high-level operational planning and organization, of all branches of communications, and of the whole radar and observer network.

This year Royal Auxiliary Air Force squadrons will take part in the Air Exercises. The association (or re-association) with Regular squadrons will be of the greatest value, and it is to be hoped that the day is not too far distant when the Volunteer Reserve will likewise be permitted—and suitably equipped—to take an active and useful part in the testing of our air defences.

The increasing strength through co-operation and unity of the West European *entente* will find practical expression in the joint participation of Western Union Navies—Britain, France, Belgium and the Netherlands—in the manœuvres. Moreover, the U.S. Air Force will again take part in the Air Exercises. Later, when the many European countries have had more experience with their British jet fighters—Denmark is the latest recipient, the first of a batch of 20 Meteors are shortly to be delivered—it may be possible to plan, on an ambitious scale, Western Union combined exercises. Promotion of even closer co-operation between these Air Forces which are already bound by wartime association, standardized equipment and even in uniform in some cases, is no longer merely desirable; it is essential, as one of the most positive ways of working for peace.

While there is no reason to suppose that any potential enemy has bombers which can compare with the latest types now going into service with the U.S.A.F. it is nevertheless clearly desirable that our jet-fighter defences should be tried out against the most advanced adversary in existence. Though the same objective can to a certain extent be achieved by employing, say, Meteors to simulate a high-speed, high-altitude enemy bombing force, the benefit and experience would be enhanced for both sides if examples of America's best bombers could fill this role.

Interception Challenge

In this connection it is pertinent that the latest round in the American contest between aircraft carrier and big bomber concerns a Navy challenge which the Army Services Committee of the House of Representatives has ordered the Army Air Force to accept. The Army is to take part in a duel in which deck-landing jets will endeavour to intercept B-36 heavy bombers. The Navy, who are smarting under the cancellation of their 65,000-ton carrier which was to have had sizable bombers as part of her equipment, hope to prove that the large bombers which have won the first round are vulnerable to fighters and at the same time that a carrier can defend itself against their attack.

Several recent articles in *Flight* have been much concerned with the performance of the B-36 and other large bombers, and we proposed that a flight of Vampires, the high-altitude performance of which surpasses that of American fighters, should be sent up to attempt the interception of a B-36 force. If these huge, heavily defended machines—now carrying, in addition to their six main piston-engines, two wing-tip "pods" each containing a pair of turbojets—are in fact capable of operating at nearly 400 m.h.p. at over 40,000ft the U.S. Navy will not find aggressive interception at all easy. However, of the four fighter types which might take part in the duel—Banshee, Fury, Panther and Pirate—all have relatively low wing-loading for deck operation, and they may, therefore, fare better high up than would their more heavily loaded Army counterparts built primarily for speed and range.

SYWELL ANNIVERSARY

Well-supported Aerial Display at Northampton : Lord Pakenham Declares Ministry's Policy on Club Subsidy

Illustrated by "Flight" Photographs

TO some 10,000 spectators at Sywell on Saturday, May 21st, it was perhaps a little mystifying that such brilliant weather should be anything but ideal for a flying display. Encouraged by the cloudless sky, the air-minded public of Northampton, Wellingborough and Kettering, and flying enthusiasts from many clubs throughout the country, converged upon the airfield in time for the opening by Lord Pakenham at 1425 hours, but those who had arrived by air were already apprehensive of the haze which was to hamper the high-speed events.

By 1300 hours a true garden-party atmosphere had developed in the attractive clubhouse gardens, members' enclosure and in the clubhouse itself and, as aircraft landed, many familiar faces were to be seen. Among these visitors were several to remind us that this event was a 21st anniversary affair, for it was in 1928 that the Northamptonshire Aero Club was formed and on September 29th of that year the "first great aerial pageant" took place at Sywell. The presence of Mr. John Brancker, for instance, recalled that it was his father, Sir W. Sefton Brancker, who had opened that inaugural event; and that of "Jim" Cordes was a reminder of the more active part he had played in 1928, when he demonstrated the Handley Page slotted wing fitted to a Gipsy Moth.

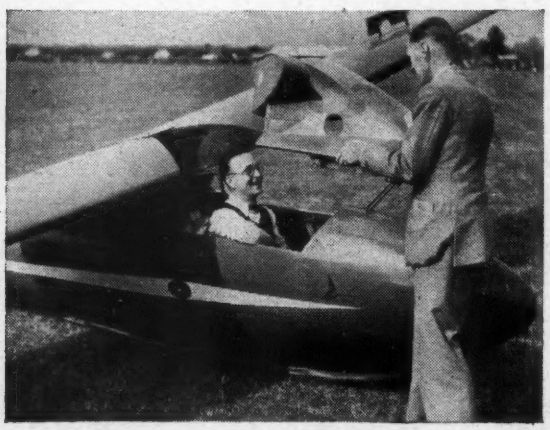
In a gaily decorated hangar members of the club entertained their friends to a particularly appetizing lunch, at which the guests of honour were Lord Pakenham and Mr. Lindgren, in whose constituency Sywell is situated. Mr. C. M. Newton, chairman of the Club, who is one of two original members still serving on the Committee, welcomed the guests and urged financial support for the flying clubs so that charges could be lowered.

The answer to his impassioned appeal was provided earlier than anyone could have anticipated—actually by Lord Pakenham, who replied to the welcome and to a toast to his health. The Minister said that it was difficult to make a case for subsidizing flying clubs in the present circumstances or to foresee one in the years ahead. He thought that no matter what political party was in power there would be no money available for such support. He admitted that the clubs had a great part to play in aviation and that there was perhaps an argument and a case associated with defence; but although he wished to help the clubs nothing could be expected from the Ministry of Civil Aviation in the form of financial aid.

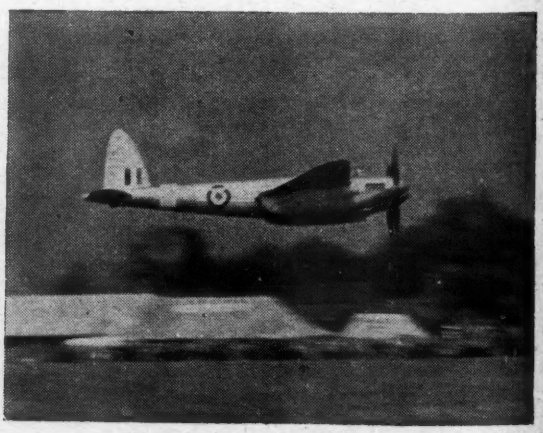
This declaration of policy was taken by those present to mean that the only remaining hope of support was from the Air Ministry. Such hope is indeed thin, however, since the vote provided for the Regular Air Force is considered barely adequate and the Air Council has let it be known that no further burden in the form of a club subsidy could be accepted. The Air Ministry has also freely voiced the opinion that club flying can no longer provide training suitable for Service pilots. The reaction of the clubs to such sentiments would be that facilities already exist for training women pilots, A.T.C. cadets, and for maintaining experienced pilots in constant practice without ties to a Reserve School or Squadron.

Afterwards, many who had heard the speech expressed the opinion that this was an unfortunate choice of time and occasion for the declaration of such an important matter of policy by the Minister. It was generally felt that,

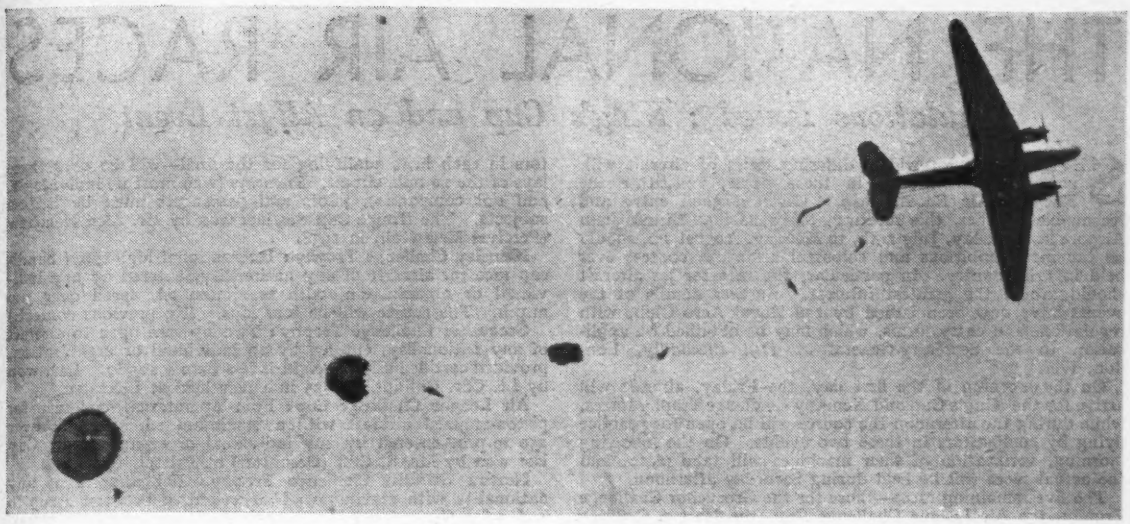
Mr. Marsh in the Cierva Skeeter, plays airborne quoits. His act demonstrated the sensitive controls of this lively British helicopter.

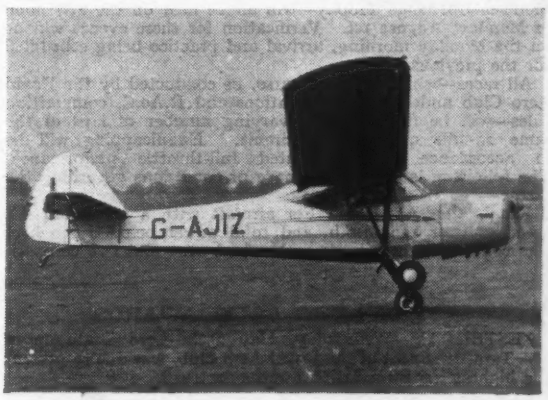


F/L. Causton helping Mr. Jerry Smith to prepare for his aerobatic display in the Olympia Eon sailblane.



Capt. "Timber" Wood reminded spectators that the Mosquito is still a fast and versatile aircraft.





(Above) A stick of five parachutists jumping from the Dakota. (Right) S/L. Porteous gave a convincing demonstration of the Auster fitted with the Goodyear cross-wind undercarriage.

although no concrete promise had ever been made, the clubs have been encouraged in the past by the thought that eventually assistance might be forthcoming, but all hopes had now been dashed in a most casual manner.

During the luncheon members of the Northamptonshire Model Aero Club displayed their models in front of the clubhouse and immediately afterwards Lord Pakenham inspected a guard of honour provided by the Northamptonshire Unit of the Air Training Corps and declared the display open. The first "event" was not on the programme and fortunately had no disastrous consequences. A visiting aircraft, after an initial attempt at landing, appeared to be about to go round again when its starboard wing dug into the ground and the aircraft slid to an abrupt standstill between a hangar and a committee tent. The occupants climbed from the machine unhurt and the attention of the crowd was soon diverted by three Tiger Moths of No. 6 Reserve School, R.A.F.V.R., Sywell, taking off in vic formation. They changed to echelon to port, to line astern and then back to a neat vic to land.

S/L. Porteous maintained his usual high standard of aerobatics with the Miles M.18. He started with a series of three rolls which alone demonstrated the capabilities of his bright red, highly manœuvrable, little monoplane. He then stall-turned, looped, half-looped off a half-roll and then rolled off the top of a loop.

In the meantime, Mr. Jerry Smith of the Lancashire and Derbyshire Gliding Club was preparing to be towed-off in an Olympia sailplane. Unfortunately, the cable slipped and the towing Auster made a circuit without its charge. The next attempt was successful, but the delay had upset the timing of events, and from this the display never fully recovered. While the Olympia was towed to 2,500ft, Capt. "Timber" Wood, chief test pilot of the General Aircraft Co., demonstrated the aerobatic and single-engined capabilities of a Mosquito which had been rebuilt by Brooklands Aviation, Ltd., in their factory at Sywell.

Gliding displays are always a welcome feature in a programme consisting mainly of powered-flight events, and Mr. Smith's Olympia was put through a polished and well-timed display of silent aerobatics which finished with a dive and low-level flight across the airfield before a zoom and turn to land in front of the public enclosure.

Spitfires of No. 504 (County of Nottingham) Squadron, R.Aux.A.F., under the command of S/L. J. M. Birkin, D.S.O., D.F.C., A.F.C., which had been standing-off during the glider display, then flew in from the west in vic formation with one in the box. After further runs in line abreast, and in line astern stepped down, they broke up to perform individual rolls, loops and other aerobatics so far as the limited visibility would allow. The Cierva Skeeter was then started up and Mr. H. A. Marsh, the company's test pilot, proceeded to flying hither and thither, forwards and backwards and to pirouette gaily in the centre of the airfield. When his time was finished he had no trouble in "landing-on" the trailer. An even more convincing display of precision helicoptering was given later in the programme, when he plucked a smallish ring from a tripod on the ground by means of a hook on the nose of the Skeeter. During that manœuvre we could see through the transparent nose the very fine touch necessary for control.

The promise of a Vampire team from No. 605 (County of Warwickshire) Squadron, R.Aux.A.F., had everyone on his toes, but after a wait of some 15 to 20 minutes the best that could be done were three slow runs across the airfield at about 300 to 400ft in vic formation, so misty were the conditions. The Auster fitted with the Goodyear cross-wind undercarriage had been on demonstration to a Government mission at Ypenburg, Holland; it was recalled for this display and landed in time for S/L. Porteous to demonstrate some incredible manœuvres on the ground.

Parachute dropping by members of No. 1 Parachute and Glider Training School, Upper Heyford, provided one of the most interesting spectacles of the afternoon. After the usual ground preparations a Dakota made runs across the airfield and dropped four sticks of five parachutists. One felt that this event, interesting though it was, could have been perhaps a little more lively with the introduction of mock war hazards. The display ended on a note of absurdity by members of the flying club, who played with a jet helicopter of their own weird design.

THE NATIONAL AIR RACES

Regulations Issued : King's Cup and an All-jet Event

SEVEN events for widely differing types of aircraft will, as already mentioned in these pages, constitute the National Air Races, 1949. Given a good entry and reasonable weather, this meeting, to be held at Birmingham Airport from Friday, July 29th, to Monday, August 1st, should be the most ambitious and colourful air speed contest ever held in this country. In particular, the race for jet aircraft should arouse the greatest interest. Further details of the events have now been issued by the Royal Aero Club, with regulations and entry forms, which may be obtained on application to the Secretary-General at 119, Piccadilly, London, W.1.

On the morning of the first day, the Friday, aircraft will arrive for the King's Cup and Kemsley Challenge Trophy Races, while during the afternoon the course will be open for practice flying by competitors in these two events. On the following morning, verification of their machines will take place, and the actual races will be held during Saturday afternoon.

The five remaining races—those for the Grosvenor Challenge Trophy, the Air League Challenge Cup, the Norton Griffiths Challenge Trophy, the S.B.A.C. Challenge Trophy and the Siddeley Challenge Trophy—will all be held on the afternoon of Monday, August 1st. Verification for these events will be on the Monday morning, arrival and practice being scheduled for the previous day.

All races—which will, of course, be conducted by the Royal Aero Club under F.A.I. regulations and R.Ae.C. competition rules—will be flown over a varying number of laps of the same 20-mile quadrilateral circuit. Handicapping will be in accordance with estimated full-throttle performance. The following is a brief summary of conditions governing the races:—

King's Cup Air Race: For aircraft with a maximum s.l. speed of over 120 m.p.h. and total power below 1,000 h.p. The course for three heats and a final—the first five competitors in each heat qualifying for the final—will be over three laps of the 20-mile circuit. Entrants (who must be individuals, and not companies), pilots and passengers must be British subjects. The King's Cup was last won by Mr. Alex Henshaw (Percival Mew Gull) in 1938.

Kemsley Challenge Trophy: International high-speed handicap race for aircraft of any nationality, entered by any individual or organization, with maximum s.l. speed over 300 m.p.h. The course will be four laps. (No previous contest.)

Grosvenor Challenge Trophy: Two-lap race open to aircraft of any nationality, entered by an individual or organization, provided certified all-up weight is less than 2,205 lb. Last won by Lt. Cdr. Phillips in 1935 in a race held at Leicester.

Air League Challenge Cup: Four-lap international race for piston-engined aircraft with a maximum s.l. speed of over 250 m.p.h. entered by any individual or organization. Cup last won by Mr. S. Cliff (Desoutter) at Bristol, 1932.

Norton Griffiths Challenge Trophy: For aircraft of any nationality with maximum all-up weight of between 2,205 lb and 3,858 lb, entered by an individual or organization. To be flown over three laps. (No previous contest.)

S.B.A.C. Challenge Cup: Four-lap international race open to any type of aircraft powered by a gas-turbine unit or units, entered by an individual or organization. The S.B.A.C. Cup was previously awarded in a private-aircraft race, and was last won by Lord Willoughby de Broke (B.A. Eagle) at Bristol in 1935.

Siddeley Challenge Trophy: This three-lap race is for British light-aircraft clubs which are members or associate members of the Association of British Aero Clubs and Centres. Each club may enter one machine, which may have an all-up weight not exceeding 3,858 lb, and must be the property of the club or the pilot entering. Pilots must be non-professional members representing their clubs. The race was last won by Mr. W. M. Morris (Midland Aero Club) in 1948.

ROYAL AERO CLUB AWARDS

YESTERDAY—Wednesday, May 25th—Lord Brabazon of Tara, president of the Royal Aero Club, was due to present the highest British aviation awards for 1948.

First of these presentations was the *Britannia Challenge Trophy*, awarded to G/C. John Cunningham, D.S.O., D.F.C., for his achievement in regaining the height record for Great Britain by flying a de Havilland Vampire I to 59,446ft on March 23rd, 1948. The Trophy, presented in 1913 by Mr. Horatio Barber, goes annually to the British pilot making the most meritorius performance of the year.

THE SEAGRAVE MEMORIAL TROPHY was presented to S/L. John Derry, D.F.C., for his 100-km. closed-circuit record of 605·23 m.p.h. on the de Havilland 108, achieved on April 12th, 1948. The Trophy (presented jointly by the R.A.C., R.Ae.C., and Marine Motor Association) commemorates the late Sir Henry Segrave and is awarded to the pilot "who . . . has accomplished the most outstanding demonstration of the possibilities of transport by land, air or water."

S/L. Derry also receives the GOLD MEDAL OF THE ROYAL AERO CLUB—the 25th to be awarded—in recognition of his achievement in exceeding the speed of sound, which he did while flying the D.H. 108 on September 6th.

The award of the SILVER MEDAL OF THE ROYAL AERO CLUB to Mr. Alan Bristow marks his successful attempt, with the Westland-Sikorsky S-51 helicopter, to deliver supplies to the Wolf Rock lighthouse-keepers after efforts to send supplies by sea had failed.

Also due to be presented yesterday were commemorative medals from the Aéro-Club de France; the recipients were the pilots concerned in the 47-minute "Hare-and-Tortoise" flight between London and Paris on September 30th—Mr. Eric Swiss (Bristol 171 helicopter), S/L. W. A. Waterton, A.F.C. (Gloster Meteor 7), and Mr. A. E. Bristow (Westland-Sikorsky S-51).

NEXT SATURDAY'S GOODYEAR RACE

AN entry of 31 aircraft has been received for next Saturday's Goodyear Trophy Race, to be flown during the Air Display arranged by the Wolverhampton Aero Club at Wolverhampton Airport. In addition to the Trophy, substantial cash prizes (£100 first, £50, £25, etc.) have been donated by the Goodyear Tyre and Rubber Co. (Great Britain), Ltd.

Three left-handed circuits, each of approximately 21 miles, will be flown. Technically, the competing aircraft present no startling novelties, though G-AKDC, the Gemini flown by J. N. Somers, is the machine modified by the fitting of Gipsy Major engines, as illustrated in *Flight* of May 12th.

The final of the race starts at 15.30 hours.

Entrant*	Club	Aircraft	Registration	Racing Number
D. J. Jemmett ...	Wolverhampton	Hawk Trainer III ...	AKPE	1
R. A. Walley	"	Auster J.1	AGVN	2
A. G. Lockley ...	"	Auster Mk. V ...	AJFI	3
B. F. Francis	—	Auster J.4	AIPG	4
J. H. Parkin	—	Auster J.1	AJRH	5
J. N. Somers, Ltd. (J. N. Somers) ...	—	Gemini (Gipsy Major)	AKDC	6
P. Barton (S. Robinson)	Wolverhampton	Hawk Major... ...	ACYO	7
C. G. Alington ...	—	Sparrow Hawk ...	ADNL	8
J. A. Bradley	Wolverhampton	Auster J.1	AIGR	9
J. E. Onions (D. A. Ray)	"	Auster Mk. V ...	AKPI	10
G. Bickley	"	Auster Mk. V ...	AJTV	11
E. R. Pyatt	"	Proctor IV	AKEF	12
P. W. Bayliss ...	"	Proctor III	AKXZ	14
D. McCaskill	"	Auster Mk. V ...	AIPO	15
C. Turnill	"	Hawk Trainer III ...	AHNV	16
L. E. T. Barley ...	"	Auster J.1	AHAO	17
C. A. Woodward (A. McDowall) ...	Derby	Hawk Trainer III ...	AITN	18
Midland Aero Club (A. J. Penzer) ...	Midland	Auster "D" ...	AHVS	19
W. Stuart	—	Proctor III	ALIS	20
A. L. Cole	—	Comper Swift ...	ABUS	21
R. H. Timmis ...	Wolverhampton	Hawk Trainer III ...	AHNU	22
D. Everall	"	Auster J.1	AHST	23
Hereford Aero Club (M. J. Edwardes) ...	Hereford	Auster J.4 ...	AIPL	24
W. H. Binns (W. A. Bower)	Wolverhampton	Auster J.1	AIGH	25
G. Reid Walker ...	"	Piper Super Cruiser	AJGY	26
R. R. Paine and E. Ward (R. R. Paine)	"	Hawk Trainer III ...	AKPF	27
R.L. Porteous ...	—	Auster Arrow ...	AJXZ	28
Blackburn & General Aircraft (P. G. Lawrence)	—	Proctor I	AHVG	29
Worcester Aero Club (M. Morgan) ...	Worcester	Chrislea Super Ace...	AKVD	30
H. T. Ryan	Wolverhampton	Hawk Trainer III ...	AHNW	31
J. C. Rice	Leicester	Tiger Moth	AHRC	32

* Where the entrant is not himself the pilot, the pilot's name is given in parenthesis.

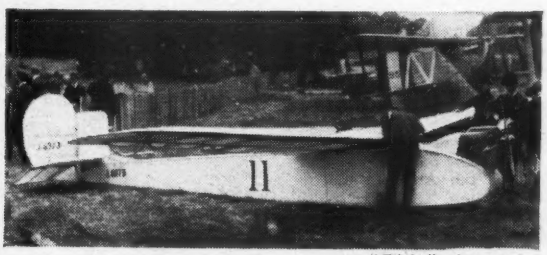
JET-BOMBER BACKGROUND

Thirty-eight-year Record of the English Electric Company

THOUGH a very large manufacturing organization, the English Electric Company is not widely known as an aircraft constructor, and therefore the announcement of its A.1. jet bomber (illustrated in *Flight* last week may have surprised the uninitiated. In fact, however, the Company has an association with design and production traceable back to 1911.

In that year the Coventry Ordnance Works—one of five companies amalgamated to form the English Electric Company in 1918—designed, built and entered an aircraft for the military trials and competitions. The other companies in the merger were Dick, Kerr and Co., Ltd., of Preston; the Phoenix Dynamo Manufacturing Co., Ltd., of Bradford; Willans and Robinson, Ltd., of Rugby; and Siemens Dynamo Works, Stafford. The first three of these companies built landplanes and marine aircraft to Government designs during World War 1 and Willans and Robinson made aircraft engines. Dick, Kerr and the Phoenix Dynamo Company were between them the largest producers of flying boats in this country, and from their works stemmed a variety of aircraft of from 7,000 lb to more than 30,000 lb gross weight.

One of the last flying boats designed and built by the English Electric Company was the Cork, with a span of 85ft and a length of 49ft. One version was powered with two Rolls-Royce Eagle engines (360 h.p. each) and the second by 450 h.p. Napier Lions. The Kingston—likewise with Lions—was a development of the Cork. Especially interesting among the products of E.E.C. was the Ayr biplane flying boat of the early post-war years in which an attempt was made to solve the problem of stability on the water by making the lower wings as an extension of the hull. These were sharply stepped-up



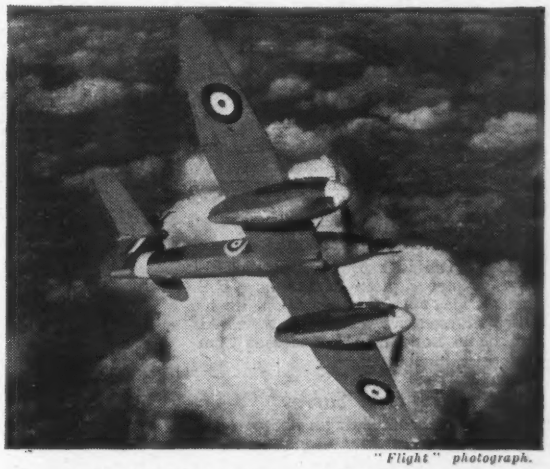
"*Flight*" photograph.

The dainty little Wren—an "ultra-light" of 26 years ago, first flown by S/L. Maurice Wright. Latter-day aircraft produced by English Electric Company have included the Hampden, Halifax and Vampire.

and displaced the wing floats. Reports of early trials indicated that the scheme was not without merit, but development was abandoned.

The E.E.C. is perhaps best remembered for one of the smallest successful aircraft ever built in Great Britain—the delightful little Wren high-wing monoplane, with an A.B.C. motor cycle engine of, nominally, 3 h.p. but developing 6-7 h.p. at 2,600 r.p.m. The Wren's first pilot was S/L. Maurice Wright, then an Air Ministry test pilot and now a Fairey director. Frequently at the controls of the Wren was F/L. Walter Longton, a fighter pilot of World War I, whose aerobatics at R.A.F. displays in the early 1920s are still vividly remembered.

In 1926, English Electric closed its aviation department, but during the rearmament period before the outbreak of the war, the company approached the Government with the offer of manufacturing facilities for aircraft at Preston, and in 1938 received a contract for the manu-



"*Flight*" photograph.

The only British single-seat fighter with twin piston-engines used by the R.A.F. during the war was the Whirlwind, designed by Mr. W. E. W. Petter, now chief engineer of English Electric.

facture of the Handley Page Hampden medium bomber. An order for the Halifax heavy bomber followed. This aircraft was produced in large numbers and the entire Preston works was turned over to its manufacture.

Later the production of the de Havilland Vampire was allocated to English Electric by the Ministry of Aircraft Production. This aircraft has been produced, and is continuing to be made, in considerable numbers for the Royal Air Force and for Dominion and foreign governments. The Hampdens, Halifaxes, and Vampires have all been erected and flown at Salmesbury Airfield, some four miles outside Preston.

At the end of the war the Company decided to remain in the aircraft field, and a technical staff was built up under the direction of Mr. W. E. W. Petter, B.A., F.R.Ae.S., formerly technical director of Westland Aircraft, as chief designer.

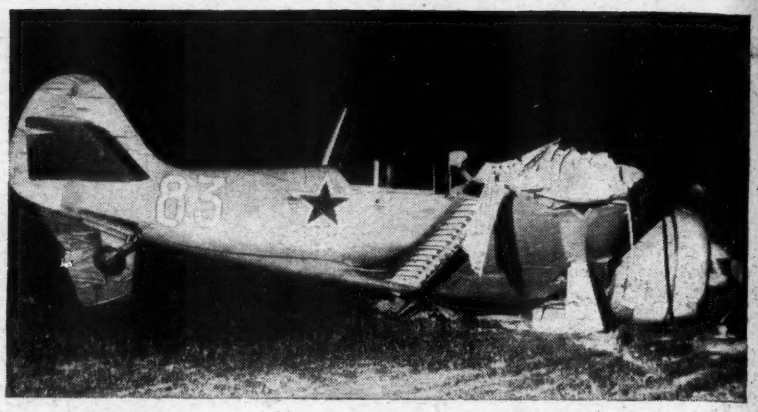
A number of large hangars were taken over by the Company at Warton Airfield on the estuary of the Ribble, some nine miles from Preston, where the design offices and experimental shops are established.

Important new testing equipment for aircraft research and development work has also been installed at Warton. It includes a welded-steel atmospheric-pressure wind tunnel, with motors and control gear of English Electric manufacture. The tunnel itself is also of the firm's own design and construction, and the special six-component balance was designed by Mr. D. L. Ellis after close study of available data from English and German sources. There is also a large mechanical-testing rig for airframe structures. A high-pressure tunnel is also available.

AEROMATICS IN ENGLAND

AT the S.B.A.C. Exhibition at Farnborough last year, an Aeromatic airscrew was included among the exhibits shown by Hordern-Richmond, Ltd., of Haddenham, Bucks. This company now announces that it has recently concluded an agreement with the American manufacturers, the Everel Propeller Corporation, to make Aeromatic airscrews under licence, the agreement covering world sales rights with the exception of the U.S.A. and South America, but including Canada. Two models of this excellent little automatic v.p. airscrew will be manufactured here, the F.200 suitable for engines up to 155 h.p., and the F.220 for engines up to 350 h.p.

HERE AND THERE



RUSSIAN FURY: Soviet counterpart of the Hawker Fury, this Lavochkin fighter, reported to be designated La-11, and resembling the La-9, was crash-landed on May 18th on an airfield outside Stockholm. In addition to two synchronised guns there appears to be provision for two wing guns. The machine—but not, it is reported, the 27-year-old Lieutenant who flew it—has been handed back to the Russian authorities.

Strike Century

BEAUFIGHTERS of the R.A.F. based at Kuala Lumpur last Saturday made their 100th strike against insurgents in the Malayan jungle.

New U.S. Attaché

REAR-ADMIRAL D. S. CORNWELL, a former captain of the new U.S. carrier *Philippine Sea*, has taken up his duties as American Naval and Naval Air Attaché in London. He succeeds Commodore T. Shelley.

Long-term Survey

THE task of completing a photographic survey of Australia—some 3,000,000 square miles—is expected to take six or seven years. A squadron of Australian-built Mosquitos is at present engaged on the work, one-third of which has already been accomplished.

More U.S. Jet Bombers

IT is reported by *Western Flying* that a new, raked-wing medium bomber, the Martin XB-51, is due to fly in October. A variable-incidence wing and a triple turbojet installation are among features of the XB-51 new to jet-bomber design; two TG-190 axial turbojets are mounted externally and the third is installed in the fuselage. Other new jet types are the Convair XB-53 and the Boeing XB-55, light and medium bombers respectively, and the Boeing XB-52, a heavy bomber approaching the Convair B-36 in size and powered by the new J-57 turbojets.

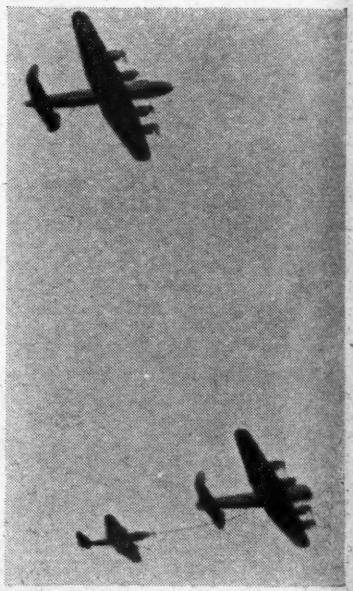
Old Sarum Display

SEVERAL new British prototypes and U.S.A.F. Superfortresses will be among aircraft taking part in a two-day demonstration of air weapons and transport support, to be held at the School of Land Air Warfare, Old Sarum, on May 31st and at Netheravon on June 1st. The programme also includes ground strafing for Meteors and formation aerobatics by Vampires. The demonstration is not a public one.

Citation for C.A.S.

IN recognition of his outstanding leadership in aviation during the war, Marshal of the Royal Air Force Lord Tedder has been presented with a citation from No. 501 (City of New York) Air Service Post of the American Legion. The presentation was made last Saturday at the American Embassy in London by Mr. Harry A. Bruno, a former member of the R.F.C.

LOCKHEED'S LATEST: The new XF-90 penetration fighter made its first public appearance at taxi-ing trials last week, when runs of 90 m.p.h. were made with Mr. Tony Le Vier, Lockheed's chief test pilot at the controls. Shown well in this view are the XF-90's raked surfaces, long "needle-nose," wing-tip tanks, and the disposition of its two turbojets. Further details of the machine are given on the following page.



FEEDING TIME: A Meteor 3, loaned by the Ministry of Supply to Flight Refuelling Ltd., is seen during refuelling over Bournemouth last week. The Lancastrian tanker is from Tarrant Rushton, Dorset.

Double Mamba's Weight

AN outstanding exhibit at the Paris Show was the Armstrong Siddeley Double Mamba. This exhibit was illustrated on p. 527 in our issue of May 5th, in which connection it should be noted that the weight-figure quoted for the unit should have read 2,000 lb.

Saga of the "Swoose"

A BOEING B-17D Fortress which remained in service from the time of America's entry into the war until VJ-Day was recently installed in the newly founded National Air Museum of the Smithsonian Institute. The bomber was damaged in the Japanese tip-and-run attack on Clark Field in the Philippines on December 7th, 1941, and was re-built

HERE AND THERE

from other machines. Its name, *Alexander the Swoose*, was taken from a jingle about a bird that was half-swan, half-goose. On the nose of the *Swoose* are painted the flags of 35 countries it has visited.

301 Jolly Sailormen

A RECORD load of 301 passengers—U.S. Navy personnel—and a crew of seven has been carried by the Martin flying boat *Caroline Mars* from San Francisco to San Diego. Chairs were removed and duffle bags served as seats.

Largest Floatplane

BEFORE the war, Italian constructors —notably the "Cant." organization—favoured large floatplane transport aircraft, the most ambitious being the Cant. Z.511 of approximately 36 metric tons. The Breda company now announces a version of its four-Centaurus B.Z.308 long-range airliner (span 138ft) with float undercarriage. The floats will be pressurized and accessible in flight and will be utilized for stowage.

And Another!

THE latest American fighter to be revealed is in the "penetration" class. Described by its makers, the Lockheed Aircraft Corporation, as a heavyweight edition of the F-80 Shooting Star, the new XF-90 is shown by a photograph (reproduced on p. 612) to be a larger and more advanced design than the earlier aircraft, although there are traces of a family likeness.

Wing and tail surfaces are raked, and there are large side intakes for two fuselage-installed turbojets. A long "needle-nose" is embodied. Exceptionally large for a single-seater, the XF-90 is said to be about the same weight as the Dakota (some 25,000 lb at take-off). The new fighter was seen by the public for the first time at Burbank, California, on Tuesday of last week. Flight tests are to be made soon at Muroc, California.

"*Flight*" photograph.

TURTLE THRUST: Holder of the world's long-distance record of 11,236 miles in the Lockheed P2V "The Turtle", Lt. Cdr. Tom Davies, U.S.N. looks on at Orly while Aerojet J.A.T.O. rockets are attached to "The Turtle" for demonstration. A "Flight" representative who flew in the aircraft reports smooth, progressive acceleration from the rockets.

Walrus Pearl-spotters

AN ex-R.A.A.F. pilot, Mr. Eric McIlree, has equipped two Walruses for spotting beds of pearl shell off the North-West Coast of Australia. Before the war the beds were worked by Japanese, and their locations are unknown to Australian pearlers. Each aircraft will carry an experienced diver and diving equipment, and special fuel dumps will permit continuous operation.

Evidence of the presence of pearl beds —dugong grass on the ocean floor—is, of course, detected from the air more easily than from surface vessels, although these will also be engaged. It is learned that the Commonwealth Government is so anxious to discover the beds that pearlers using their luggers in the search will be exempted from income tax until 1950. Luggers and amphibians will have two-way radio for inter-communications.

"Wooden Horse" Film

THE book of the *Wooden Horse*, by Eric Williams, M.C., is to be adapted for the screen. If a suitable prisoner-of-war camp is available it will be used when production begins in Germany later this year; otherwise a reconstruction of Stalag Luft III, which is in the Russian Zone, will be made.

The cast has not yet been finally selected, and *Air Mail* (the official journal of the Royal Air Forces Association) reports that Mr. Jack Lee, the director, of Wessex Film Productions, Ltd., Pinewood Studios, Iver Heath, Bucks, is anxious to hear from ex-R.A.F. actors who were prisoners of war, particularly those who were in Stalag Luft III.

News in Brief

FOR "skilful application of a new aviation technique," Major K. M. Zotov, of the Soviet Air Force, has been awarded the Order of the Red Banner.

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"Fly by British Air Lines" is the slogan now being stamped on letters and postcards at a number of Post Offices.

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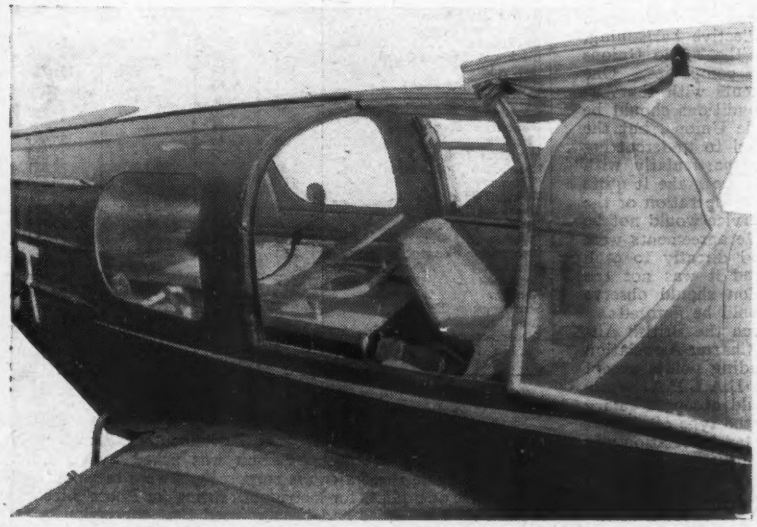
Taking part in the international campaign against the Colorado Beetle in Normandy, a Sikorsky S-51 helicopter of Pest Control, Ltd., was due to begin operations last week-end in the Caen area.

* * *

Australia's first aircraft carrier, H.M.A.S. *Sydney*, arrived in Melbourne last week. This 14,000-ton light fleet carrier, of the *Majestic* class, was formerly H.M.S. *Terrible*, before its transfer to the Royal Australian Navy last December.

* * *

At the British Industries Fair, Gas Turbines, Ltd., of New Zealand, placed a £2,000 order for air compressors and compressed air equipment with Hymatic Engineering, Ltd. Incidentally, the technical manager of Hymatic, Mr. H. R. Haerle, is to read a paper on "Aircraft Pneumatics" at the Anglo-American Aeronautical Conference in New York this month.



FLACE DES INVALIDES? For a 140 h.p. light aircraft, the Mk. 2 ambulance version of the popular French Norecrin has a particularly neat stretcher installation. The rearward-facing attendant's seat allows quick access to the patient.

CIVIL AVIATION NEWS

Minister's Warning to Charter Lines on Standards of Operation: B.E.A. and Summer Rushes: Mr. Bevin Praises Civil Air-Lift Effort

MR. LINDGREN'S WARNING

SPEAKING at a luncheon on May 16th to celebrate the inauguration of the Lancashire Aircraft Corporation's service between Blackpool, Leeds and London as an associate company of British European Airways Corporation, the Parliamentary Secretary to the Ministry of Civil Aviation referred to the conditions of associate agreements, particularly with regard to wages and conditions of employment.

There had been more than 200 applications to operate associate agreements, he said, and they had all been considered in less than three months. It would be agreed by all, he thought, that the Air Transport Advisory Council had carried out effectively and speedily the consideration of applications. Up to the present time 69 services had been approved in principle and he drew attention to the fact that seven of them were for applications made by the Lancashire Aircraft Corporation. That seven out of eight applications from that company had been approved indicated, he thought, the wisdom and responsibility with which the Corporation had applied for routes. He expressed appreciation of the work done by Mr. Eric Rylands as Chairman of the British Air Charter Association.

Mr. Lindgren then referred to the high operational standards of safety and passenger-handling established by B.E.A. and said that companies operating in association with the Corporation had a special responsibility in maintaining those standards. There were some with very high standards indeed who could with justice claim to operate on a par with B.E.A. or B.O.A.C. but there were others whose standards left much to be desired. The British Air Charter Association had set high standards of operation and he hoped they would be ruthless in ensuring that they were maintained.

These observations, continued Mr. Lindgren, applied equally to salaries, wages and conditions of employment. Here again the B.A.C.A. had done good work in collective bargaining, on behalf of the charter companies, with the Trade Unions which catered for the employees of those companies. One of the conditions of the associate agreements with the Airways Corporations was that wages and conditions should be those agreed in conjunction with the Trade Unions, but the Minister's attention had already been called to undercutting in salaries and conditions of employment, particularly with regard to pilots. He (Mr. Lindgren) wished to make it quite clear that the lowering of either standards of operation or the undercutting of wages and conditions of service would not be tolerated. The terms under which associate agreements were granted had been made clear publicly and directly to each applicant and, in conclusion, he considered it was not too much to ask that those making application should observe the conditions under which the licences would be granted.

Discussions have been in progress between the British Airline Pilots' Association and the British Air Charter Association and agreement was reached on all outstanding points except insurance cover and the salary structure. B.A.L.P.A. representatives insisted that the B.A.C.A. should accept a salary structure based upon flying experience and the type of aircraft flown according to all-up weight. The Charter Association was unable to accept B.A.L.P.A.'s proposed insurance cover of four times the basic salary. Negotiations have broken down and B.A.L.P.A. has asked the Ministry of Labour to refer the differences to the Industrial Court in order to effect a settlement.

At the luncheon, Mr. Eric Rylands, Managing Director of the Lancashire Aircraft Corporation, referred to the important step being taken in the establishment of scheduled services by independent air operators. Lord Douglas, who was also a guest, said that the charter companies' operations were very necessary in filling the gaps in the British Airways Corporations' services. During the Berlin Air Lift the Lancashire Aircraft Corporation had flown 2,000 sorties and carried some 15,000 tons of freight and 30,000 gallons of fuel.

LYMPNE AIRPORT

IT has been reported that since the upkeep of Lympne Airport has involved the Ministry of Civil Aviation in a loss of £17,000, it is to be disposed of. The circumstances are that the Ministry has asked the Aerodrome Owners' Association if any organization would be interested in its purchase and Folkestone Town Council are considering the project. Although the M.C.A. is willing to consider any offers, if none is forthcoming it is probable that it will continue to retain the airfield in use.

JANUARY AIRPORT ACTIVITY

A TOTAL of 80,609 passengers passed through 39 civil airports in the United Kingdom during January. The table shows, in Column A, the number of landings by aircraft on scheduled services and charter flights only, whereas column B is for all other flights. Column C shows the number of passengers passing through the airports on scheduled services and international charter flights and the last column is for freight on similar operations.

	Aircraft Movements (a)	(b)	Passengers In and Out (c)	Freight (lb) In and Out (d)
Aberdeen (Dyce)	262	504	701	8,554
Belfast (Nutts Corner) ...	318	20	4,634	50,007
Belfast (Sydenham)	14	604	—	—
Birmingham (Elmdon) ...	16	629	—	—
Blackbushe	73	373	1,153	24,356
Blackpool (Squires Gate) ...	33	567	—	—
Bovingdon	100	706	618	305,723
Bristol (Whitchurch)	12	540	—	—
Cardiff (Pengam Moors) ...	108	1,101	166	—
Croydon	201	524	239	59,350
Edinburgh (Turnhouse) ...	25	903	—	—
Hurn	44	1,440	448	25,893
Inverness (Dalcross)	245	23	1,149	17,818
Isle of Man (Ronaldsway) ...	200	37	1,940	33,031
Kintyre	117	15	381	25,660
Kirkwall (Hatston)	523	25	1,192	14,991
Liverpool (Speke)	339	225	3,821	66,224
London Airport	1,547	574	16,659	1,270,766
Lympne	14	415	5	1,982
Manchester (Ringway)	269	604	2,039	94,295
Northolt	2,103	334	26,566	663,157
Prestwick	469	277	5,446	51,296
Renfrew	600	116	5,214	37,425
Southampton (Eastleigh) ...	257	1,043	1,307	6,494
Southampton Water	72	389	1,189	41,540
Weston-super-Mare	93	536	163	—
Yeadon	9	832	—	—

QUESTIONS IN PARLIAMENT

ON Wednesday, May 18th, the Parliamentary Secretary to the Ministry of Civil Aviation was asked by A. Cdre. Harvey why the three airways corporations were to be allowed to test their own pilots for instrument rating for Pilots' Licences when other companies had been refused that concession. Mr. Lindgren replied that it had been arranged as an interim measure of practical expediency in view of the number of pilots to be tested. Whether the arrangements should continue or

be extended to other operators, was, he said, under consideration. There were 2,000 pilots to be examined, 1,000 of which were in the Corporations. The remainder, Mr. Lindgren said, could conveniently be examined by the Ministry's organization "provided they were not all crammed into the last few months."

On being questioned as to the progress being made with regard to the purchase of four Boeing Stratocruisers from Scandinavia for B.O.A.C., the Parliamentary Secretary informed the House that an agreement had been concluded between the Corporation, S.A.S. and the manufacturers for the assignment to the Corporation of the contract (which had been agreed between the Scandinavian company and the American manufacturers) for the supply of the aircraft and necessary spares. He was unable to quote an accurate figure for the sterling price which would be paid, but stated that delivery should take place in September or October of this year and that the aircraft would first be operated in 1950.

HUNTING'S ITALIAN CHARTER

UNDER contract to the British Legion, Hunting Air Travel, Ltd., are flying from Bovingdon Airport to various destinations in Italy near which British war cemetries are situated. The first Viking, carrying 24 passengers, left Bovingdon on May 16th at 1130 hr for Rome.

The flight takes about five hours and each party is able to spend two or three days in Italy. Each aircraft carries a hostess and a courier who also acts as interpreter during the visit. The exact number of passengers involved in the charter is not yet known as bookings are still being accepted by British Legion branches throughout the country, but applications for between 4,000 and 5,000 passages have already been received and more are expected. Among the flight destinations are Rome, Milan, Bologna, Naples, Treviso, Ancona, Bari, Catania (Sicily), and Cagliari (Sardinia).

B.E.A. PLAN SPECIAL SERVICES

BRITISH EUROPEAN AIRWAYS have based their summer programme of internal services on the actual number of passengers carried during the summer of 1948, and extra flights will be operated as the occasion demands. Altogether, 336 extra services have been made available up to the end of September, 204 on the Channel Islands route and 58 on the London-Belfast run.

Extra flights have been scheduled to the Isle of Man for the Motor Cycle T.T. Races in June, and for the British Empire Trophy Race the midday northbound service on May 23rd and the midday southbound service on May 27th will both call at the Isle of Man instead of flying, as normally, non-stop between London and Belfast. An extra flight will be laid-on should a last-minute rush justify it.

INDIAN AIRLINE'S PROFIT

AFTER one year of operating non-scheduled flights, Airways (India), Ltd., started route flying on April 15th, 1947, and have now completed their second year of scheduled services. Daily services are flown on a route Calcutta-Bhubaneswar-Vizagapatam-Madras-Bangalore; two flights each day between Calcutta and Dacca; and daily flights Calcutta-Bagdogra-Gauhati-Dibrugarh with two additional direct flights between Calcutta and Gauhati.

The number of passengers carried has increased from 327 in 1946 to 9,910 in 1947, and 31,476 during 1948, the first full year with scheduled services. Similarly, aircraft miles flown were 10,941 in 1946, 504,711 in 1947 and 1,315,115 during 1948 in 8,476 hours. Revenue cargo, including freight, excess baggage and newspapers, amounted to more than 620 tons last year, when the net profit was approximately £30,000. The aircraft fleet in January, 1949, consisted of nine Dakotas, two Doves, two Cessna UC-78s and one Piper L-4.

I.C.A.O. THIRD ASSEMBLY

REPRESENTATIVES of the 52 member-states of the International Civil Aviation Organization will meet in Montreal for the Third Assembly of the Organization, commencing on June 7th. The Assembly is expected to last between two and three weeks. Among the items on the agenda is the adoption of the provisional rules of procedure already approved by the Council, subject to further examination by an appropriate committee of the Assembly. The Executive Committee, Committee on Rules of Procedure and the Credentials Committee will be established, and the president and vice-presidents of the assembly elected. Invitations to non-contracting states and international organizations to participate in the work of the Assembly will be confirmed. Decisions will also be made on the suspension of voting power or other action to be taken in the case of member-states failing to discharge their financial obligations to I.C.A.O.

NEW K.L.M. SERVICES

ON May 17th, the 29th anniversary of K.L.M.'s first flight, made between London and Amsterdam, a new Constellation service was inaugurated at a frequency of three a week between Amsterdam and New York via Shannon and Gander. This is the first time in 30 years that a K.L.M. regular service has landed at Shannon, stops hitherto having been made at Prestwick, which will still handle seven round trips each week on the Company's North Atlantic service. In addition to providing a more direct route between Holland and North America, the new service links at Amsterdam with feeder services to Rome, Istanbul and other parts of Europe.

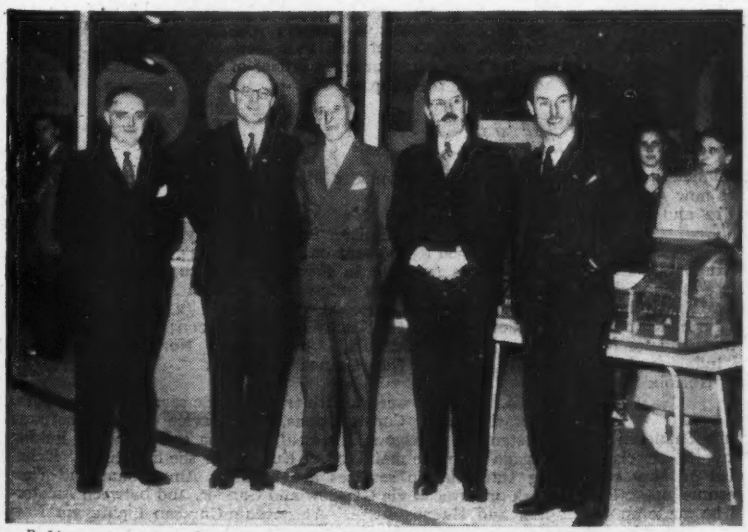
A weekly service between Amsterdam and Surinam (Dutch Guiana) started on May 20th. Operated with Douglas DC-6s equipped with sleeper accommodation, the service leaves Amsterdam every Friday and arrives at Paramaribo Airport 26 hours later, after brief halts at Madrid, Lisbon and Dakar. From Paramaribo a connecting service gives direct communication with Caracas and Curacao.

SABENA SUMMER SERVICES

ON May 16th, when Sabena introduced summer timetables on all services, they put the six new Convair 240 aircraft on the main European routes linking Brussels with Paris, London, Geneva, Zurich, Milan, Rome, Naples, Madrid and Lisbon. Convairs will replace DC-3s on the Brussels-Nice route on July 18th.

Under the new schedules DC-6s operate three flights each week between Brussels and New York; three services each day link Brussels and Paris, two by Convair and one by DC-3; the Brussels-Basle service is extended three times a week to Berne, using DC-3s; and during August the Brussels-Deauville service will be re-opened. Between Brussels and London there are four daily flights by Convairs, scheduled to take 65 minutes for the journey, but the Antwerp-London route continues to be operated by DC-3s.

From June 1st three services each week will link Manchester with Le Zoute and Brussels, and on June 24th daily service



OFFICIAL VISIT: Standing in front of the Ministry of Supply stand at the Paris Salon aeronautical exhibition on 13th May are, left to right, M. Pineau, French Minister of Public Works, Transport and Tourism; Lord Pakenham, British Minister of Civil Aviation; Major Purvis, Minister of Supply; Air Marshal Douglas Colyer, Civil Air Attaché, Paris; and Mr. Whitney Straight, Chief Executive, B.O.A.C

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between London and the Belgian Coast will be introduced. From July 16th until September 6th the frequency will be increased to two flights each day, with extra flights at the week-ends.

Sabena has been operating for 25 years, during which time 726,175 passengers have been carried. The fleet now consists of 51 aircraft, including DC-6s, DC-4s, DC-3s and six new Convairs. Route mileage over the entire network amounts to 34,176.

I.A.T.A. PUBLIC RELATIONS CONFERENCE

REPRESENTATIVES of 20 member-airlines of I.A.T.A. recently attended the Association's first Public Relations Conference in Oslo, and a concerted international programme to develop all-year traffic over the world's airlines was advocated. The Conference also requested the setting-up of permanent machinery to ensure continuous co-operation between international airlines in public relations matters and supported a project for continuous international publi:-opinion research which would enable the airlines to know more exactly the preferences and prejudices of the air-travelling public.

During the Conference the representatives studied information submitted by the U.S. Department of Commerce on the travelling habits of American tourists; discussed new techniques of public relations work; and compared notes on the organization and administration of airline public-relations establishments. Major General Hjalmar Riiser-Larsen, president of D.N.L., was chairman of the Conference, with Messrs. Fahnestock and Vogels as vice-chairmen. The I.A.T.A. Public Relations Officer, Mr. S. Ralph Cohen, was secretary.

A NEW V.H.F. TRANSMITTER

AFTER investigating the requirements of users of V.H.F. transmitters all over the world, Standard Telephones and Cables, Ltd., have produced a 50-watt V.H.F. transmitter especially suited for ground to air communication. The frequency range of the first models is 115-135 mc/s, but since many other uses are envisaged for this transmitter provision has been made to supply models to operate on a number of bands within the range 70-150 mc/s.

It was found that one of the features required at airports was the ability to speak through the same microphone to aircraft listening on two different frequencies, and arrangements have therefore been made whereby the operator can select at will transmission on either one or both of two frequencies. To make this possible the r.f. equipment is duplicated and the power-supply equipment and modulator are so designed that they can drive both r.f. units at once. A. V.O.G.A.D. (voice-operated gain-adjustment device) incorporated in the speech amplifier ensures a substantially constant depth of modulation, irrespective of wide variations of input level. The transmitter is housed in a single cabinet.

FOUGA FREIGHTER: Taking off from Orly is the C.M.100, designed and built by the Fouga Company primarily as a freighter, but adaptable for passenger work or mixed loads. The engines are S.N.E.C.M.A. 12s, giving 580 h.p. each for take-off. A proposal exists for installing small auxiliary turbojets for take-off and emergency use.

It is anticipated that the transmitter will normally be operated from a remote position and a very flexible remote-control system has been provided. Simple operation of the transmitter can be obtained over one pair of lines, control of three additional facilities over two pairs, or control of six facilities over three pairs. In the simplest case the operator can transmit either speech or m.c.w. from the remote position, the h.t. being switched on and selection of service being automatically obtained by operation of the key or the pressle switch on the microphone handset. Additional facilities obtainable include choice of transmission on either or both frequencies and control of l.t. and h.t. supplies.

TRIBUTE TO CIVIL AIR LIFT

MR. BEVIN, speaking recently in the House of Commons, praised the work of the civil companies operating the Berlin Air Lift. He was grateful, he said, for the opportunity of paying tribute to the contribution which the British civil air-charter companies had made to the success of this great operation. No fewer than 26 of these companies had participated in the Air Lift at one time or another during the past ten months. Official figures provided by the Air Ministry showed that almost a quarter of the total supply tonnage borne to Berlin by British aircraft operating in the Air Lift was carried by them.

Another fact which was perhaps not sufficiently known, said Mr. Bevin, was that the entire quantity of liquid fuels—including petrol, diesel oil and kerosene—which the Western sectors of Berlin had received by means of the Air Lift was carried in British civil aircraft. In the month of April, for example, supplies of this kind amounting to over 400 tons per day were transported in a fleet of civil air tankers specially adapted for the purpose.

BREVITIES

FARES on the B.E.A. and Air France Manchester-Paris service were reduced on May 17th, and are now £11 single and £19 16s return. The old fares were £12 and £21 12s respectively.

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A reduction of 50 per cent in fares for students making return flights on Qantas Empire Airways services during school holiday periods has been granted. The fares are applicable to children between 12 and 18 on international services and 12 to 19 on internal services. The return fares are valid for four months and will in particular help students living in India, Malaya, New Guinea, New Britain, Fiji and Norfolk Island who attend Australian schools.

* * *

All services flown between Hong Kong and Shanghai by British Overseas Airways Corporation, and by its associated company Hong Kong Airways, were suspended on May 16th for an indefinite period. The decision to resume operations if conditions should improve in Shanghai will be made on the spot by British Overseas Airways' Far East representative in Hong Kong.

* * *

The Australian Minister for Air recently announced that the £A13,900,000 to be spent on improving 134 Government-owned airfields, as reported in *Flight*, May 12th, would be divided between the states as follows (all sums in Australian £): New South Wales, £3,632,000; Queensland, £2,464,500; Victoria, £1,960,000; South Australia, £1,482,000; West Australia, £1,407,600; Tasmania, £1,069,000; Northern Territory, £1,017,500; and New Guinea, £788,800.

* * *

K.L.M. are to open a fifth transatlantic service on May 29th. Operating with Constellations, the service will fly between Amsterdam, Glasgow, Montreal, Havana and Curacao, linking Canada with the mainland of Europe for the first time. Existing transatlantic services are between Amsterdam and New York or Curacao via Glasgow and Gander, and between Amsterdam and Buenos Aires. Amsterdam-Curacao flights via New

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York will decrease from three flights to one flight a week when the service through Montreal is opened.

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About 8,000 square miles of forest land in North Sweden are to be surveyed and mapped photographically from about 13,000ft by two aircraft. The work is being done by the State cartographic authorities.

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It has been reported from New Delhi that all Dakotas operating with Indian airlines will go out of commission in 1951 and be replaced by a faster type of transport aircraft. About 110 Dakotas now operate internal services in India.

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Qantas Empire Airways have equipped a Lancastrian as a breakdown-aircraft. It can fly a spare engine and maintenance crew to any Qantas or B.O.A.C. Constellation delayed by engine trouble at any point along the route between Sydney and Karachi, so saving the cost of maintaining stocks of spare engines at intermediate airports.

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Capt. N. S. Buckley, chief pilot of Guinea Airways, has been elected president of the Australian Air Line Pilots' Association, with Capt. A. C. Lovell, of A.N.A., as vice-president, and Mr. Keith Steedman as general secretary. Membership of the association has increased from 420 two years ago to 645 in 1949; all members hold air transport licences.

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During March, 3,713 Americans visited England, in addition to 1,588 passing through on their way to other destinations. According to the Travel Association, the number of U.S. visitors showed an increase of 27 per cent over the previous March and a slightly higher proportion travelled by air than in March, 1948; this year exactly a third of all the visitors arrived by air.

* * *

Sir Patrick Dollan, chairman of the Scottish Advisory Council for Civil Aviation, recently referred to the great increase in Scottish air traffic since 1939, when 10,000 passengers were carried, mainly on internal routes. In 1948, no fewer than 205,000 were carried, 90,000 on routes going overseas. It was expected, he said, that during 1949 the figures would be increased to 250,000.

* * *

Special through-rates for passengers and freight are in force on Skyways (East Africa), Ltd., services to and from Mauritius and destinations in Europe and North America, including New York, Montreal, Amsterdam, Copenhagen, Stockholm and Oslo.

* * *

It is understood that the first weather ship, under the joint control of K.L.M. and the Netherlands Indies civil aviation authorities, has been installed in the Indian Ocean to act as a radio beacon and to broadcast meteorological information.

* * *

In the three months ending March 31st, Pan American Airways carried 9,792 passengers across the Atlantic in approximately the same number of flights made during the corresponding period of 1948, when 7,001 passengers were carried. Total passenger revenues for the three months were 15 per cent higher than in 1948, despite lower rates.

* * *

A daily service between Deauville and London will be opened by Air France on June 3rd. Aircraft will leave Croydon for Deauville every weekday at 1715 hr and Sundays at 1915 hr; the flight takes one hour. On July 14th there will also be daily services to Deauville from Paris and one to La Baule. On May 17th Air France reduced fares for all services from Manchester to the Continent and North Africa.

SWISS DESIGN: This view of the Pilatus P.4 climbing steeply from a small mountain airfield shows the cantilever undercarriage. A small but versatile aircraft, capable of carrying four passengers and a pilot, it is powered by a 260 h.p. Lycoming GO-435 six-cylinder engine driving an Aeromatic constant-speed airscrew.

B 15

FROM THE CLUBS

AFTER a period of enforced inactivity during the war years, the Royal Naval Flying Club is about to re-open at the Royal Naval Air Station, Gosport. Qualifications for membership and details of the fleet are given in "Service Aviation" (p. 634) in this issue.

* * *

ON Monday, May 16th, the Orkney Flying Club, in conjunction with the Orkney Education Authority, held the fourth of a series of ground-training lectures at Kirkwall. The senior air-traffic control officer of the M.C.A. at Grimsetter, Mr Smith, discussed air navigation. A lecture on May 9th on meteorology, by Lt. Cdr. R. C. Ross, R.N.V.R., was illustrated with two films.

* * *

DUTIES of chief flying instructor of the Lancashire Aero Club have been taken over by J. M. M. Thompson. The new C.F.I. has had long instructional experience, at Reading before 1939, in the R.A.F. during the war and in Syria immediately before taking up this appointment. His predecessor, W/C. W. L. Woodward, A.F.C., was appointed manager and chief instructor of the Club in 1937 and rejoined in 1946 after service as an instructor in the R.A.F. during the war. He has now returned to South Africa, where for a period during the war, he was in command of No. 48 Air School (E.A.N.S.) at East London and Port Elizabeth.

* * *

FURTHER details are now available of the arrangements made for the Yorkshire Aeroplane Club's international rally to be held at Sherburn-in-Elmet from June 11th to June 13th. On arrival at Lympne on June 10th and 11th, the foreign visitors will be welcomed by Messrs. Bidgood, Catton and Rigby, who will assist them through the formalities of clearing Customs, and arrange for their arrival at Sherburn in time for lunch in the clubhouse on the Saturday. The Lord Mayor of Leeds is holding a civic reception in the late afternoon at the Town Hall, after which guests will depart by motor coach for the Hotel Majestic, Harrogate, where cocktails will be served, followed by dinner and dancing until 2345 hr.

At 1000 hr on the Sunday the guests will be taken by coach to Scarborough, for lunch at the Prince of Wales Hotel. After a short interval for sight-seeing and tea the guests will be taken back to Monk Fryston Hall, Sherburn, where the farewell banquet will be held in the evening, preceded by cocktails and followed by dancing. On the Monday morning the guests will be taken by car to Sherburn, where coffee and biscuits will be served prior to their departure.

Since there is accommodation for only 100 people in the banqueting hall at the Hotel Majestic, a waiting list has been opened for the dinner on the Saturday evening, but members and their guests can reserve tables for dinner and dancing in the normal way. A few tickets may still be available for the farewell banquet on the Sunday; the price, inclusive of dinner, champagne and dancing, is £1 12s 6d per person.

NORTH-AMERICAN SUPERSONICS

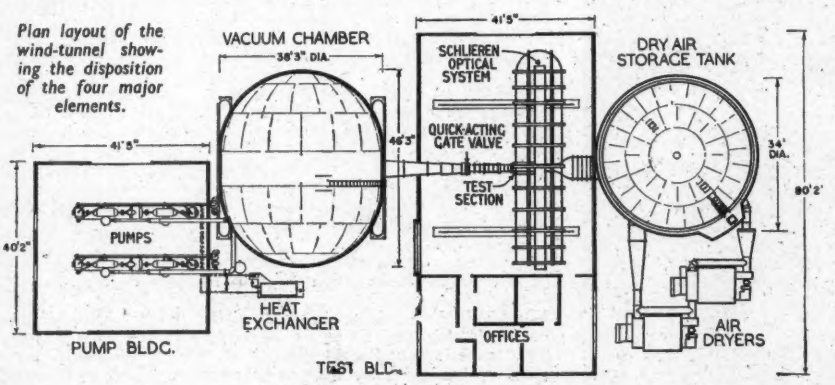
Vacuum-type Tunnel Designed to give Velocity of Mach 5.25

Model of guided missile being mounted in tunnel working section. Nozzle blocks of varying profiles permit air speeds of a range equivalent of from 930 to over 4,000 m.p.h. at sea level.

IT is, of course, widely realized that, both in manpower and fiscal strength, our American friends have some very considerable advantage over us. Some measure of what this difference in resources can mean is offered by the fact that, at the Los Angeles base of North American Aviation Incorporated, has been built a supersonic wind tunnel which in size and capacity far out strips anything possessed in this country, not only by our aircraft manufacturers, but by government establishments as well. Certainly, North American's supersonic tunnel is the largest of its kind operated by an aircraft company in the United States, but that a private company should have a piece of research equipment beyond the resources of our whole country, impoverished though we may be is, to say the least of it, a sorry state of affairs.

We have supersonic tunnels over here, of course—in point of fact, we have quite a number of them. But they are all quite small and of quite low supersonic-speed capacity. In this connection, it should, nevertheless, in all fairness be pointed out that we are feeling our way, and the experience gained with our present small supersonic tunnels should serve as useful foundation data upon which to design and build larger tunnels of greatly increased capacity. Just how far off these larger tunnels are, however, cannot as yet be stated.

Plan layout of the wind-tunnel showing the disposition of the four major elements.



Based on the German Kochel design, the North American tunnel has a working section 16in square and is capable of producing an airflow velocity of Mach 5.25, i.e., 4,000 m.p.h. As an entity, the tunnel consists of four major units: a dry-air storage tank with a capacity of 22,500 cu ft; a 36,000 cu ft vacuum chamber; the tunnel working section connecting the storage and vacuum tanks; and the vacuum pumps. The vacuum chamber is of approximately prolate spheroid form and can, it is said, be evacuated to a 99.8 per cent complete vacuum.

Operation of the tunnel is essentially simple. Whilst the vacuum chamber is being evacuated, the storage tank—which has a balloon-like inner container—is being filled with dry air (moist air would condense into fog under the influence of the very low temperature in the test section, interfering with observation and, by reason of "condensation shock," causing erratic forces to act upon the specimen). The one tank having been emptied and the other filled, a gate valve in the tunnel duct is opened and differential pressure between the tanks forces the dry air violently through the tunnel working section into the vacuum chamber. Operation, naturally, is not continuous: a test run averages about 15 sec in duration, and re-exhaustion, for example, takes about 6.3 min for a Mach number of 4.38.

The specimen-balance is of the "sting" type, in which upper and lower quadrants are rigidly joined at the centre by a sting, or arm, which projects forward into the air-stream. The quadrants operate in ball bearings carried in fully adjustable supports. The specimen-mount itself is motor-operated, and the specimen can be set to any angle of attack between zero and ±12 deg; angular changes can be made at rates up to 3½ deg/sec. Forces imposed on the sting are measured by strain-gauges at various points.

For observation, an adaptation of the well-known schlieren optical system is employed. A beam of light is directed across the working section, and the compression and expansion of the air flowing past the model refracts the light in varying degrees, so that, through a series of mirrors, the shadow-patterns can be viewed, or filmed to provide photographs of the airflow characteristics.

A detailed description of the tunnel appears in the current (May) issue of *Aircraft Production*.

HERMES V PROGRESS

THAT the Hermes V, with its Bristol Theseus turboprops, is expected to be ready in time to make its public debut at the S.B.A.C. Display in September was announced in the chairman's statement circulated for the annual general meeting of Handley Page, Ltd., held last Thursday at Cricklewood. That the newest Hermes will have thermal de-icing was also mentioned, though whether it will operate by "bleeding" from the power units or by self-contained heaters was not specified.

In general, the statement reviewed Handley Page achievement from the early days—appropriately, for this was the company's fortieth year of existence—to the present time, when the Hermes IV, 25 of which have been ordered by B.O.A.C., are in full production. On the military side, the Hastings is proving its worth in service on the Berlin Air Lift.

The aircraft park on Sunday, May 15th.

Climax to the Paris Salon

THE Orly "manifestation," to borrow the Parisians' own description of the fine display and exhibition described in the preceding issue, was all too brief. Such an assembly of widely differing and technically interesting aircraft was deserving of more thorough examination than was possible on May 14th and 15th. Fortunately *Flight's* chief photographer was able to secure the accompanying studies which, supplemented by those already printed, form a valuable record of the occasion.

France's continuing reliance upon other countries for certain classes of power plant was evident in the fitting of Pratt & Whitney engines in the S.E. 2010 Armagnac and S.O. 30P Bretagne. Production versions of the Breguet 761 double-deck transport will similarly have American engines. Rolls-Royce Nene turbojets constructed by Hispano Suiza powered all four of the French jet prototypes flown at Orly.

Among the more startling technical developments, the experimental high-aspect (32.5) wing of the tiny H.D. 10 was something never before imagined and was typical of the courageous research programmes now under way in France.

A great deal of thought has been directed by French manufacturers toward the development of specialized freight-carrying aircraft not only of large (Breguet 761 and N.C. 211) but of medium (Breguet 890) size. The Breguet 761 has clam-shell loading doors in the lower rear fuselage; the N.C. 211 is loaded like the Bristol 170, and the Breguet 890 (generally similar to the 892 displayed) is to have a folding rear fuselage.

Concerning French jet fighters, it would, perhaps, be premature to attempt an assessment in view of their recent completion and lack of development flying. Certainly the Dassault Ouragan gave the most impressive performance at Orly, as was to be expected, for it is much lighter than the S.O. Espadon and has a relatively low wing loading. Span, length and weight are respectively quoted as 40ft, 35ft and 12,300 lb, the corresponding figures for the Espadon being 34ft 9in, 48ft 2in and 17,600-18,300 lb.

From what is known of other French jet fighters now under construction, it appears that these, like current American types, will have high wing-loadings and may consequently incur serious penalties in respect of high-altitude performance. The wisdom of the French Government in acquiring the licence for the de Havilland Vampire will thus be seen.

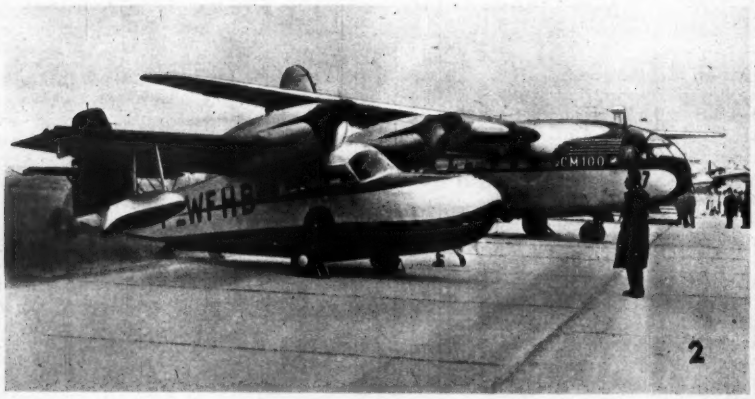
Mr. Gibb presents the Bristol 170 (two Hercules 672).

The Pratt and Whitney-engined S.O.30P at speed.

(Below) Breguet's new Type 892 mixed-traffic aircraft.

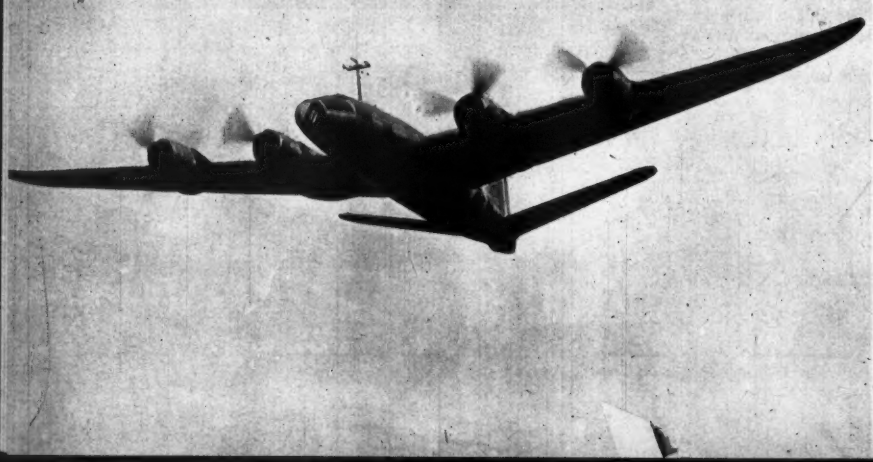
1. The S.E.2010 "Armagnac" long-range transport (four Wasp Majors) is intended for Air France transatlantic services.

Climax to the Paris Salon...

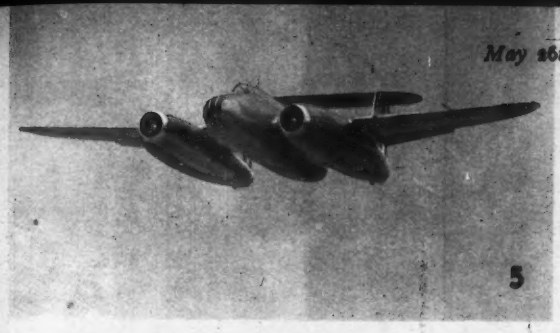


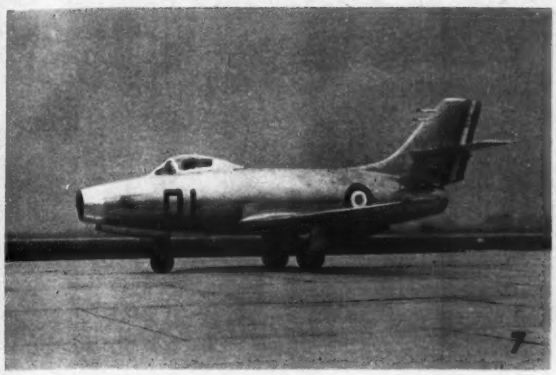
2. The sturdy amphibian is the S.C.A.N.30. Beyond it is the Fouga C.M.100, a good-looking and economical type for passenger or freight work over distances up to 900 miles.

3. "The Turtle," record-breaking Lockheed P2V, gets away with 4,600 b.h.p. and 4,000lb of J.A.T.O. thrust.



4. A specialized high-altitude photographic machine—the shapely S.E.1010.





5. The N.C.1071—a twin-Nene trainer, dive-bomber or torpedo aircraft, forerunner of an all-weather fighter of higher performance.

6. Except for wing area, everything about the S.O.5020 Espadon is of generous dimensions. Note the ventral intake for the Nene.

7. The first prototype of the Marcel Dassault M.D.450 Ouragan intercepter (Nene), claimed to have a speed of 600 m.p.h

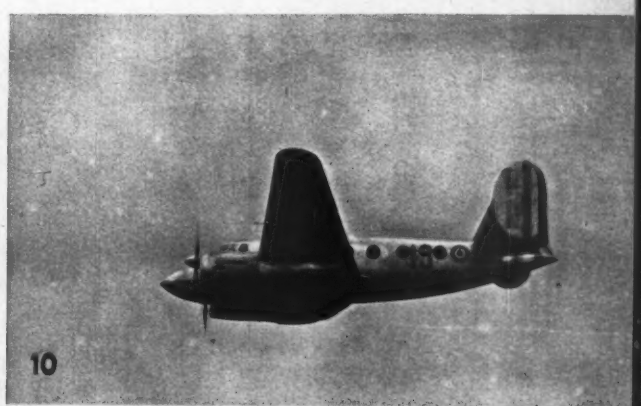
8. The wing area of the S.O.6000 Triton jet trainer is even less than that of the Espadon. Three intakes feed the R.-R. Hispano Nene.

9. Suitable for transport or training, the Nord 2100 Noreazur pusher cruises at 185 m.p.h. The engines are two Potez 8 Do 3s.

10. A very sturdy-looking light military transport is the Dassault M.D.315 This type is already in production.

11. The Morane Saulnier 700 has been designed for colonial operation. An ambulance version was displayed in the Grand Salon.

12. Low over the runway, the S.O.95 feeder-liner shows its appealing lines. Numbers of these aircraft are in use.



For Search and Research

THAT the Avro Shackleton G.R.1 long-range reconnaissance bomber is equipped to carry an exceptionally heavy load of anti-submarine weapons will be gathered from the extent of the bomb bay, visible above. Also apparent is the neat installation of the four Rolls-Royce Griffon engines, noted for their economy, and the lead-in at the tail for a refuelling hose. The Shackleton was designed with tail-wheel undercarriage to leave the nose free for equipment.

In the revealing study of the Hawker P.1052 (below) the twin outlets from the Rolls-Royce Nene turbojet are especially well shown. Piloting this same aircraft, Mr. T. S. Wade averaged 618 m.p.h. between London and Paris.

Balliol Progress

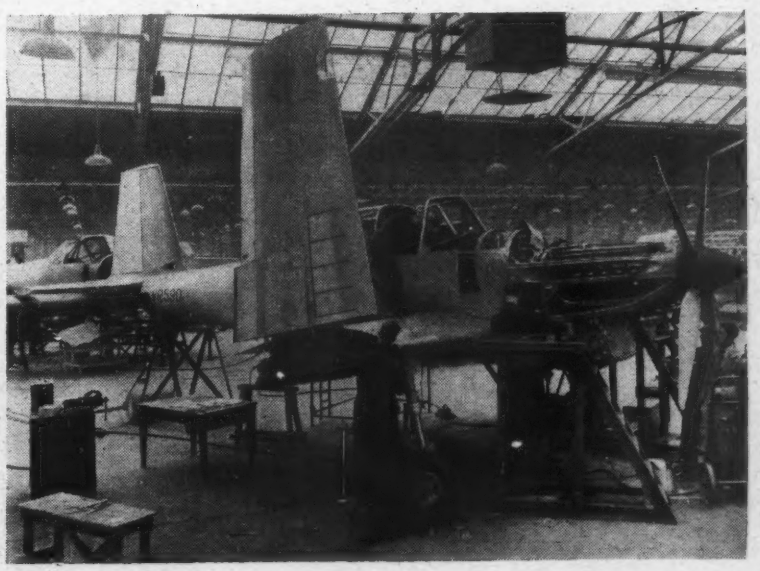
Pre-production Order for Merlin-powered Mark IIs for Service Testing at Home and Overseas

IT was in the July 1st, 1948, issue of *Flight* that a fully detailed description of the Boulton Paul Balliol Mark I advanced trainer appeared, and the time has now come when some further measure of progress can be recorded.

Flying qualities of the Balliol Mark I, powered by an Armstrong Siddeley Mamba turboprop, were reported on in our February 3rd issue this year. The three Mark I prototypes were followed by the construction of four prototype Mark IIs employing Merlin 35 engines. One of these latter aircraft, having undergone the normal Boscombe Down trials, is now out at Khartoum, where its suitability for tropical operation will be assessed; from all reports, it appears to be behaving very well. The flight out to Khartoum was made with wing drop-tanks and was accomplished without incident.

In the meantime, Boulton Paul Aircraft, Ltd., have received an order for 17 pre-production Mark II Balliols, the first batch of which are now nearing completion. These pre-production aircraft will be sent out on extensive Service trials to Squadrons and Maintenance Units, both in this country and in Rhodesia. Whether there will, however, be a hiatus between the completion of the intermediate 17 and the placing of a firm contract for production Balliols remains to be seen. The Avro Athena is competing for the same prize.

The Balliol certainly makes a very fine showing in meeting the requirements of its design specification; its in-built quality of simplicity in maintenance should prove a powerful factor in its favour. Other things being equal, the value of an aircraft is dependent upon its flying serviceability, and this shows up in a trainer perhaps to a greater degree than in any other military type, particularly in peacetime. The influence of ease of maintenance on flying serviceability is too obvious to need emphasis. Further to aid the maintenance problem, a large measure of interchangeability has been introduced into the



The first batch of pre-production Merlin-Balliols are now nearing completion up at Wolverhampton.
"Flight" photograph.

Balliol Progress . . . . .

design of Balliol components. Fins and tail-planes are interchangeable, whilst elevators, ailerons, undercarriage legs and wing tanks are similarly interchangeable port and starboard.

The difference associated with the Merlin-engined Mark II in comparison with the Mamba-powered Mark I is slight. In maximum speed, it is chiefly a matter of height, the Mark I giving 307 m.p.h. at 20,000ft, and the Mark II 305 m.p.h. at 11,500ft. At 10,000ft the Mark I has a maximum continuous cruise rating of 269 m.p.h., whilst at the same altitude the Mark II gives 280 m.p.h. at the rich mixture setting, and 240 m.p.h. on weak mixture.

Although the Mamba is served with 169 gallons of fuel, whilst the Merlin has 125 gallons, and 140 lb has been saved in the structure weight of the Mark II, the fact that the Merlin is some 830 lb heavier than the Mamba has been the greatest single factor in raising the all-up weight of the aircraft from 7,860 lb for the Mark I to 8,175 lb for the Mark II. But despite its 11¼ per cent greater power, the Merlin needs 10½ min to take the Balliol up to 15,000ft as against the Mamba's 8½ min.

In terms of production, the Balliol gives evidence of causing no trouble. The design is straightforward and the production processes are uncomplicated; an example is the fact that no removable fillets are used on the aircraft. No sheet-metal workers are employed on Balliols at Wolverhampton; double-curvature panels and components are all produced either in conjunction with soft-metal dies or wood-formers and rubber mattresses on compression presses, or tensioned over wooden formers on stretcher presses.

Boulton Paul Aircraft have also announced that they have again started to design and manufacture undercarriages—the original company of Boulton and Paul, Ltd., were pioneers of oleo-pneumatic shock-absorber legs—and, of course, the Balliol employs an undercarriage of home manufacture. Uniquely, the main legs, together with their retraction mechanism, are each anchored in a box unit self contained and profiled to form part of the wing leading edge. The box is located on the front wing-spar by four dowels, and the changing of a complete undercarriage unit is therefore an extremely simple matter.

A telescope of fairly long stroke is used, and the strut—together of course with the whole airframe—is designed to cater for a maximum sinking speed of 16ft/sec. This value is the latest specification figure for Naval aircraft.

"Flight" photograph.

Chiefly concerned with Balliol graduation are, left to right: Mr. R. Beasley, director and general manager; Mr. J. D. North, managing director; and Dr. S. C. Redshaw, director and chief engineer.

Technical Evidence

An Appraisal of French Design-trends

AT Orly, before the start of the afternoon's flying programme (a report on which appeared in last week's issue), it was possible to walk round and inspect the various types in the aircraft park, and to pick out some of their peculiarities for brief comment.

To take the Sud-Ouest Bretagne 30P first, the workmanlike and yet elegant appearance of the aircraft as a whole attracted immediate attention. With two Pratt and Whitney R-2800 B43 engines driving Curtiss-hubbed, Ratier-bladed airscrews of 13ft 5½in diameter, this 30-passenger transport has a cruising speed of 259 m.p.h. and a range of 934 miles. As an example both of power reserve and of confidence in the engines, on the day preceding the display the Bretagne was flown from Paris to Bordeaux and back to Paris on one engine only, a distance of 600 miles for the round trip.

The Bretagne employs a tricycle undercarriage by Dispositifs Oleo-Pneumatiques, the main legs employing a levered suspension cantilever axle whilst the upper part of the assembly is a light-alloy casting; the French favour magnesium. The nosewheel assembly also utilizes a light alloy casting for the upper portion of the strut, the sliding tube terminating in a "bell-crank" casting in which pivots the king-pin of the wheel fork.

Another feature of the aircraft is the employment of semi-Fowler-cum-slotted flaps, that is to say, the main flap surfaces move rearward and downward in the normal Fowler manner but, in addition, have their trailing edges fitted with subsidiary slotted flaps. Provided the control linkage is such that some measure of variation in pivotal geometry is permitted, it would appear that this form of flap arrangement should provide enviable flexibility in catering for many more than usual lift/drag permutations.

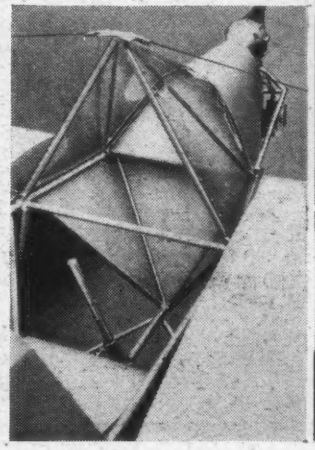
Named Mercure, the Breguet 892 high-wing freighter is a variant of the Type 890, which employs an opening rear portion of the fuselage for freight-loading purposes. In the 892, a large door on the starboard side is used. For freight handling, an in-built travelling crane with hoisting tackle is provided in the form of a thwartships beam carried on rollers in tracks along the fuselage walls. The beam is in two parts, the lower sliding on rollers relative to the upper, so that it can be extended out through the door for hoisting and lowering bulky or heavy freight. The relationship of the door and the wing root is such that the tail of the starboard inboard nacelle is hinged across the top and swung upward by a screw jack in order to be clear of the beam hoist when the latter is extended outboard. The fuselage, 1,724 cu ft in volume (34ft × 7.5ft × 6.8ft), is readily convertible to seating accommodation for 40 passengers.

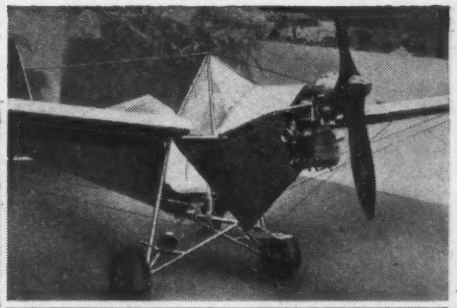
The Mercure naturally has a stalky undercarriage in view of its wing/fuselage combination, and although the design

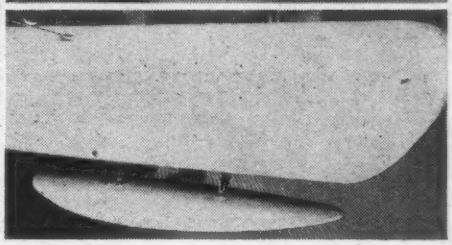
of the main undercarriage units is straightforward enough, the pivotal arrangement is not without interest. The head of the telescopic strut is fashioned in the form of a horizontal forward-extending triangulated yoke, so that the thwartships pivotal axis is located well forward of the leg axis and thus simplifies the stowage problem. This very promising aircraft was shown at Orly powered by four 580-b.h.p. S.N.E.C.M.A. 12S engines, but the makers state that it will be available in twin-engined guise, powered either with S.N.E.C.M.A. 14R or Bristol Hercules units. An excellent power installation for the Mercure would, we suggest, be provided by a pair of Double-Mamba turboprops (*Flight*, March 31st, 1949).

Although the Sud-Ouest 1010 must fairly bristle with items of technical interest, only an external examination was possible at Orly. Perhaps the most notable point about this rather unusual aircraft—it is virtually a pressurized aerial photographic laboratory—is in its use of Mercier ailerons. The surfaces are of snowshoe plan-form, the hinge line lying at about 45 deg to the line of flight. Although M. Mercier devised this form of control surface well before the war, the S.E. 1010 flew for the first time only a few months ago. The purpose of the design is chiefly to permit the employment of virtually full-span flaps, but although a possibly large yawing drag penalty may have to be paid for the use of such surfaces, it is not unlikely that some solution such as this may prove to be the answer for application to raked-wing aircraft.

The Starck "New Look" has exposed rudder-pedals on the undercarriage, no instruments and unconventional ailerons.







Large and Small

Of all the varied designs of undercarriage to be seen at Orly, perhaps the most impressive was that of the double-deck Breguet 761, if only on account of its size. An enormous light-alloy casting is employed for the upper part of each leg assembly, the sliding tube terminating at a bridge axle for the paired wheels. An unusual feature of the design is an articulation geometry calling for a jack positioned at the rear of the strut and pushing it upward and forward to retract. The nose assembly is even more unusual in that the head element is a casting of cruciform type, the horizontal arms accommodating the pivotal axis, while the vertical arms house the upper part of the sliding tube. This latter, however, is laterally cranked to form a semi-fork to the wheel, so that the telescope axis lies in the plane of wheel rotation.

Of roughly similar size to the big Breguet, the N.C. 211 Cormoran has considerably more lengthy undercarriage legs, for the simple reason that it is a high-wing aircraft, whereas the "Deux Ponts" is a mid-wing. The Cormoran leg struts are fabricated members of circular section at the lower portion of the upper leg, changing to a rectangular section "balalaika" at the head. The evident intention is that the undercarriage shall be retractable, because the crown of the strut is pivoted in a pair of massive lugs, and the forward-sloping radius strut is designed to knuckle-break in the centre. This radius strut, incidentally, is in the form of a cast light-alloy I-beam, with oval lightening holes piercing the web. Although the evidence of the design points to the fact that the undercarriage has been designed for retraction, in point of fact the nacelle underbellies of the aircraft at Orly had cover-plates over the door joints so that, for the nonce, at any rate, the undercarriage is fixed.

Another rather interesting undercarriage, but this time at the opposite end of the scale, was that employed on the Piaggio P. 136, a small amphibian. Each main wheel assembly was comprised of a welded-tube triangulated truss, the radius strut-cum-retraction member being enclosed with a concertina-type shroud of rubberized fabric with the obvious intention of guarding the mechanism from the effects of water immersion. Incidentally, this very attractive little aircraft was fitted with two-bladed airscrews by the Hartzell Propeller Company, Piqua, Ohio, employing blades of reinforced compressed plastic material.

Whilst on the subject of airscrews, it is worth noting that Ratier were exhibiting three rather interesting units on their stand in the Salon. The Heramatic, the smallest of the three, was a metal, two-blade, bracket-type unit of approximately 6ft 3in diameter and suitable for engines in the 140 to 220 h.p. range. With this was shown a large three-blade unit of 2,000 h.p. capacity incorporating two-speed pitch-change. For normal constant-speed operation, the pitch-change rate is 4 deg/sec, but for emergency feathering, a pitch-change rate of 70 deg/sec is given. The third airscrew was a five-blade unit designed for use with the 24H Arsenal engine of 4,000 h.p. Light-alloy blades are fitted to this unit, the diameter being approximately 10ft 6in whilst, as for the two-rate, three-blade type, the actuation is electric.

Of the aircraft in the Salon, a late arrival was a true ultra-light, known as the Starck "New Look" (*sic*). Its engine is an inverted air-cooled, twin-cylinder Aubier and Dunne V 2D giving 17 b.h.p. The remarkable simplicity of the welded tubular structure with ply and fabric covering may be seen in the accompanying photographs: it will be noticed that the mainplanes are wire-braced from a cabane and that the ailerons are flat-plate surfaces of semi-elliptical plan form, mounted on hinge brackets below and somewhat rearward of the wing trailing edge. The Starck is a strictly fair-weather machine, being but partly enclosed, and with a facia board completely innocent of instruments or, for that matter, anything at all.

"FLIGHT" GOLF TROPHY

THE Aero Golfing Society held its first summer meeting at Ashridge Golf Club on Saturday, May 21st. The principal competition in the morning, over eighteen holes medal play, was for the *Flight* Trophy, which was won by Mr. K. D. Morgan (Hunting Aviation management) with a score of 81 less 8 handicap = 73 net. Second place went to Mr. F. Grainger, who scored 89 less 14 = 75, and third was Mr. T. L. Morton with 93 less 18 = 75. Mr. Grainger was awarded second place on the best nine holes. Mr. C. F. Boyes was fourth (81 less 4 = 77) and Mr. W. R. K. Silcock fifth (91 less 14 = 77).

In the afternoon a four-ball bogey contest was played, the winners being Mr. C. F. Boyes and Mr. L. Morton with two up. They were awarded first place over the runners-up, Lord Brabazon and Mr. Stewart Burt, also with two up, for the best score on the last six holes. Mr. P. W. S. Bulman and Mr. R. Harbord were third with one up.

ROTATING-WING PROBLEMS

American Helicopter Society holds its Fifth Annual Forum: A Paper on Flight-testing

MANY nations sent delegates to the Fifth Annual Forum of the American Helicopter Society, held in New York City on May 12th and 13th, a fact which is indicative of the great interest taken in this type of aircraft and its problems and advantages. They came from as far afield as Australia, Canada, Great Britain, South America, Spain and Sweden, and listened with close attention to what the various specialists had to say. The Helicopter Association of Great Britain was officially represented by S/L. Basil Arkell.

At the honours dinner the retiring president, Mr. Ralph Lightfoot, reviewed the past year's work of the Society, and the newly elected president, Dr. Alexander Klemin, made his inaugural speech. Principal speaker of the evening was Colonel Dyer, of the U.S. Marine Corps, who has a very progressive helicopter unit, the past work of which he outlined before dealing with future possibilities from the point of view of military combined operations.

May 12th was devoted to theoretical subjects, while the papers presented on May 13th dealt with practical design, performance and operation. The list, in the panel below, of the papers and their authors will give an idea of the wide field covered.

Before reading Mr. Shapiro's paper (which was similar to that delivered to the recent all-day discussion at the R.Ae.S., but with some additions) S/L. Arkell referred to the close relations which exist between the British and American helicopter societies, and expressed the hope that when the Helicopter Association of Great Britain should find itself in a position to organize a forum, many members of the American society would come to England, where they would receive a very warm welcome.

Flight Testing at Patuxent

In contradistinction to the Royal Navy, the U.S. Navy has taken a keen interest in helicopters, which now form a part of its standard equipment. Initially, the U.S. Navy obtained commercial models, and it was found that these had to be modified for specialized naval use. Consequently it has now become a requirement that helicopters for the U.S. Navy must be designed, developed and manufactured in accordance with Navy specifications.

It is a function of the Naval Air Test Centre at Patuxent River, Maryland, to investigate and determine the flight characteristics of helicopters ordered by the U.S. Navy, and to evaluate equipment and developments which might enhance the value of helicopters for naval use.

In his paper on flight-tests at Patuxent, Mr. J. W. Mazur gave an interesting account of how this difficult problem is tackled. His paper forms a useful companion to that presented to the Royal Aeronautical Society in January of last year by Mr. W. Stewart, which outlined the methods employed by the helicopter flight research group of the Aerodynamics Department of the Royal Aircraft Establishment at Farnborough. For these reasons a fairly detailed summary will not be out of place here; that space does not permit the inclusion of digests of other papers read at the Forum is no reflection on their merit.

Flight-testing of helicopters by the U.S. Navy, Mr. Mazur recalled, began in 1944. The first type to be tested was the Sikorsky HNS-1. Recently tests have been completed on the Bell HTL-1 and HTL-2, and on the Sikorsky HO3S-1, all modified commercial models. Comprehensive flight-tests are now in progress on the Piasecki HRP-1 and XHJP-1, and on the Sikorsky XHJS-1. All these were designed and manufactured to meet naval requirements in accordance with Navy specifications.

The widely accepted rotary-wing theory of the present time, Mr. Mazur stated, is that advanced by the British Autogiro investigations of Glauert and Lock, and further developed by the N.A.C.A. The Flight Research Division of the N.A.C.A. at Langley Field has proved the theory by extensive flight-test investigations with the Sikorsky HNS-1. Helicopters are flight-tested at the Flight Test Division to determine performance, controllability, flight characteristics, and general airworthiness. Much attention is given to the determination of desirable features, which are then incorporated in future specifications.

Test instrumentation at Patuxent includes a photo panel, in which a 35 mm camera is used for photographing an array of indicating dials. These generally include the following: Air speed; altimeter; rotor/engine tachometer; clock; fuselage attitude; fuel flow meter; counter; carburettor deck pressure; collective stick position; rudder position; lateral stick position; longitudinal stick position; carburettor air temperature; outside air temperature; sensitive manifold pressure; metering suction differential pressure.

Selsyn transmitters actuate the control-position indicators. Control-force indicators used in conjunction with resistance strain gauges are installed in the photo panel

Papers Presented at the Helicopter Forum

"Performance Characteristics of a combined Rotary-wing and Fixed-wing System," by Dr. Kurt Hohenemser (Chief of Aerodynamics, McDonnell Helicopter Division).

"An Analysis of a Pressure-Jet Helicopter," by L. L. Douglas (Chief Engineer, Piasecki Helicopter Corp.).

"Jet-propelled Rotor for Helicopter," by J. S. Yasecko (Propeller Laboratory, Wright Field).

"Design and Construction of Fiberglass Blades and Flight Test Technique, Variable Blade Stiffness Programme," by H. Hirsch and W. Weichsel, Jr. (respectively Head of Helicopter Design Section, Cornell Research Foundation, and Cornell Aeronautical Laboratory Project Engineer, Pilot Flight Research).

"Development of Metal Blades," by R. Mayne and W. C. Johnson (Manager, Aeronautical Physics Dept., and Electrical Engineer, Goodyear Aircraft Corporation).

"Punch Card Computing Technique and its Application to Rotary-wing Problems," by F. L. Stulen (Director of Research, Parsons Industries).

"Flight Characteristics of Model 47 Helicopter," by T. J. Harriman (Assistant Chief Helicopter Engineer, Bell Aircraft).

"Flight Testing of Helicopters by the U.S. Navy," by J. W. Mazur (Helicopter Flight Test Engineer, U.S. Naval Air Test Centre, Patuxent, Md.).

"The Air Horse and the Skeeter," by S/L. Basil Arkell (on behalf of Mr. J. S. Shapiro of the Cierva Autogiro Co.).

"Fatigue Questions on Helicopter Blades," by Dr. Bo Lundberg (Director of Aeronautical Research Institute of Sweden).

"Work of Rotary-Wing Development Unit, U.S. Coast Guard Station, Elizabeth City, North Carolina," by Commander F. A. Erickson (C.O. of U.S. Coast Guard Rotary-Wing Development Unit).

"Application of Helicopters for Transporting and Laying Military Portable Pipe-line Equipment," by K. L. Treiber (Chief of Petroleum Distribution Branch, U.S. Army).

"Properties of Case-hardened Steel Surfaces, Effect of Grinding, and Method of Prevention and Detection of Defective Areas," by L. E. Follis (Development Engineer, Sikorsky Aircraft).

"Drive System Design of Model K-190 Helicopter," by Martin L. Stevens (Chief of Design Kaman Aircraft).

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whenever such information is desired. For recording data in rapid transition manœuvres, an oscillograph is employed in conjunction with the photo panel to record acceleration, control forces, control positions, rotor speed and throttle position.

A yawmeter mounted on a boom from the nose of the helicopter is used as an aid for the pilot to maintain straight flight for performance and handling tests. Fuselage attitude is obtained by means of a pendulum-type transmitter. A cup-type anemometer is used for near-zero translational air speeds, but is not entirely satisfactory for hovering and vertical climb tests, in which translational speed should be held at zero; improved instruments are being developed.

Torque meters of the resistance strain-gauge type are used wherever possible on the power shafts for determination of power distribution. Although the method has not yet been employed, it is believed that greater accuracy can be obtained by using hydraulic torque-transmitters mounted on the engine nose and power take-offs on the gear boxes.

On the subject of flight-testing, Mr. Mazur called attention to the difficulty of accurate air-speed determination in the slow-speed range (between zero and 20 knots), and pointed out one possible method, although he did not make it clear whether it is actually in use at Patuxent. The helicopter is flown in a fixed position in space opposite a tower on which accurate wind measurements can be observed. The air-speed readings from the helicopter system can then be compared directly with the known wind velocities.

Two methods have been found suitable for calibration of helicopter air-speed and altimeter systems. In one, a pitot-static trailing "bomb" is suspended 150 to 200ft below the helicopter, out of the influence of the downwash, and pressure leads from the bomb are connected to a second set of air-speed and altimeter indicators mounted in the photo panel. The second method takes the form of speed runs over a short course at constant altitude and in non-turbulent air.

Owing to the instability exhibited by contemporary helicopters, performance measurements are difficult, unless the flights are made in calm air. Flying over water produces less scatter, but there is the risk of losing the helicopter in an emergency.

At Patuxent, horse-power-required data are obtained in level flights throughout the speed range of the helicopter at several gross weights, altitudes and rotor speeds. Prior to flight, practicable high and low thrust coefficients are determined, and flights are then made at these coefficients and at intermediate values. The practice is to fly at selected gross weights, and to adjust altitude and rotor speed to produce the particular thrust coefficient that is being investigated. The recorded data from level flights are plotted in an expression of main rotor shaft/power parameter versus tip-speed ratio for various thrust coefficients.

In level flight, for each condition being investigated above the minimum power-required region, the most suitable piloting technique has been found to be that of holding constant manifold pressure and waiting until air speed is stabilized. Rotor speed, altitude and attitude are held constant during this period. In the speed range below the minimum power-required region, the technique is to reduce air speed slowly to the desired value, and to increase throttle as needed to avoid loss of altitude. Rotor speed is held constant throughout the approach and stabilized condition.

Hovering-flight data are obtained by two methods. In the first, the air speed is reduced to zero with the guidance of such indication aids as are available during the process of obtaining power-required level-flight data throughout the air-speed range. Since visual reference to the ground is difficult at altitude, a second method is used to supplement the data obtained by the first method. The helicopter is flown just above the "ground effect" when the wind is practically zero. The machine is hovered close to a tower and at constant height at several gross weights and rotor speeds for each weight. True air speed is established by cup-type anemometers in the helicopter and wind instruments on the tower.

Plotting the Data

Hover data are plotted in terms of thrust coefficient and the power coefficient at the main rotor shaft. A curve drawn through these data defines the hover characteristics. A picture of hover characteristics is presented in Fig. 1, which gives specific values of weight and rotor speeds. The power losses to fan, gearboxes and tail rotor are included.

By the employment of the performance information obtained from such plots, curves of power required for level flight throughout the speed range can be made for specific values of altitude, rotor speed and gross weight. Such curves are shown in Fig. 2.

In level-flight tests, attention is given to obtaining those data which will be of value for determining the maximum speed. This can be limited by power available, roughness from blade stalling, limit of available longitudinal control, and strength considerations.

When maximum speed is limited by power available, it is the intersection of normal power (or full-throttle power at altitude with corresponding rotor speed) with the power-required curve that marks the limit. Intersection points are shown in Fig. 2 and are plotted in

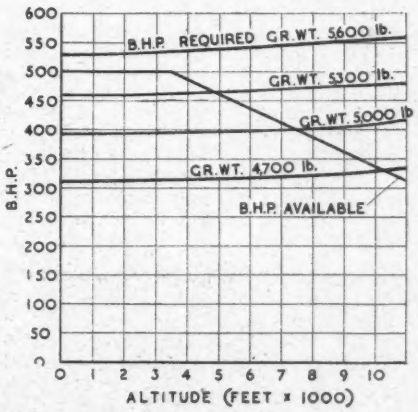

Fig. 1. Hovering characteristics, giving specific values of weight and rotor speeds. Power losses to fan, gearboxes and tail rotor have been taken into account.

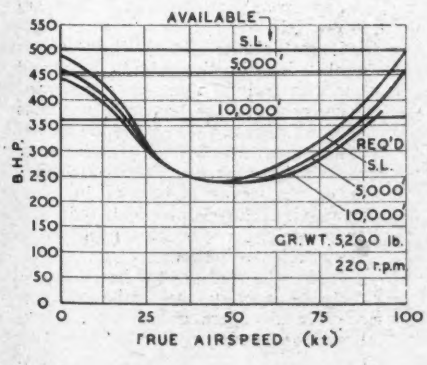

Fig. 2. Curves of power required in level flight for specific values of altitude, rotor speed and gross weight.

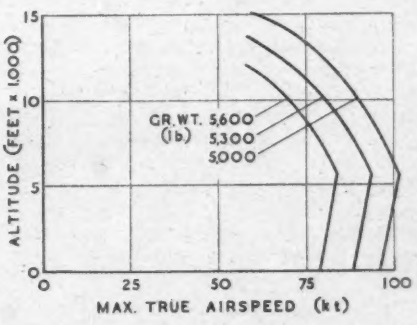

Fig. 3. Variation of maximum speed with altitude when the limit of speed is set by the power available.

Rotating-Wing Problems.....

Fig. 3 to show the variation of maximum speed with altitude.

In the case when severe roughness develops from blade-stalling, the limited maximum speed is qualitatively determined by the pilot. At the greater altitudes, or at heavier gross weights, excessive rotor-cone blow-back can place the stick on the forward stop before blade stall or rated power is reached. In such cases, the speed is limited by lack of available control and should be "red-lined" at a lower value.

Climbs with forward speed are made to determine the maximum rate of climb, service ceiling, and time to climb to service ceiling. Vertical climbs are made to determine the rate of climb and vertical-climb service ceiling.

The speed for best climb is determined by the saw-tooth method, and vertical climbs are made at several gross weights. The stability deficiency makes it extremely difficult for the pilot to guide the helicopter at zero translational speed, and it is considered that accurate vertical climb results are not obtainable until such time as stability has improved and superior air-speed detectors for vertical climb and hovering have been developed.

Turning to the subject of autorotation, Mr. Mazur said that saw-tooth autorotative descents are made at Patuxent at the normal design gross weight, and at several air speeds and rotor speeds to determine the best combination for minimum rate of descent. A study is made of the behaviour of the helicopter at entry into autorotation under conditions of simulated abrupt power failure. Failures are simulated at high engine powers and low rotor speeds throughout the speed range. Pilot reaction-time is estimated to be one second, and the collective pitch is, therefore, reduced approximately one second after the closing of the throttle. In these tests, rotor-speed decay, loss of altitude, and the motions of the helicopter are recorded.

When the machine is within 30 or 40ft of the ground, a flare-out is executed to reduce helicopter speed to below 15 knots and to increase rotor speed to a high value. The actual landing is cushioned by the lift gained from the kinetic energy of the rotor.

Sufficient autorotation investigations are made to determine the minimum altitude above the ground from which a safe landing can be made in case of sudden power failure.

"Flight" photograph.

The Cierva Skeeter prototype. The production model will be powered by a Gipsy engine. A paper on the Air Horse and Skeeter was read before the Helicopter Forum by S/L. Arkell on behalf of Mr. Shapiro.

Landings are made at speeds of less than 15 knots, and landing load factors are recorded with accelerometers. For the condition in which abrupt power failure occurs a few feet above the ground, landings are actually made and executed by reducing throttle and increasing collective pitch. The limiting height is determined by the maximum permissible load factor recorded on the accelerometer.

Control and Stability

When dealing with the subject of handling qualities, Mr. Mazur recorded that test pilots at Patuxent are exhausted after about one hour. The Bureau of Aeronautics, in consultation with the Flight Test Division at Patuxent and with the N.A.C.A., is developing new control and stability specifications for helicopters. These would be stringent, but he thought that, in view of the fact that newer developments and investigations have shown that superior handling qualities *can* be obtained, the helicopter *must* be developed to this stage if there is to be much wider acceptance of this class of machine.

Helicopter stability, Mr. Mazur said, is necessary, not only to reduce pilot fatigue and the required piloting skill, but to increase safety and usefulness. He reported that the first G.C.A. helicopter landing was made at Patuxent in April of this year with conventional instruments, but only after many hours of pilot training; and, even then, the strain on the pilot during those few minutes was such as to cause "sweat on his back." He expected blind flying to remain difficult until helicopter handling qualities are improved.

Controllability of helicopters is analysed qualitatively by the pilot and quantitatively through recorded measurements of control positions versus air speed throughout the recommended centre-of-gravity and r.p.m. range. These measurements are made in climbs, level flight and in autorotation. The effect of altitude and gross weight on control positions is likewise investigated.

It is the policy to have manufacturers specify the limits of rotor speed and centre of gravity. These limits are investigated for effect on controllability. The helicopter must

The Piasecki XHJP-1 is one of the helicopter types now undergoing official tests at the U.S. Navy's Air Test Centre, Patuxent River, Maryland.

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have sufficient available longitudinal control at high speed to compensate for divergent oscillations that might arise from gusts, and to provide for emergencies. Sufficient available aft longitudinal control must be exhibited with the tail pointed into a moderately heavy wind. And sufficient lateral control, left and right, must be available with the machine positioned broadside to a moderately heavy wind.

Rudder control should be positive and effective for producing on-the-spot turns in hovering and in moderately heavy winds, but ineffective in making such turns in winds or air speeds above approximately 35 knots.

Investigations are being made of the vibration characteristics of several helicopters in a combined programme between the Naval Air Material Centre and the Naval Air Test Centre. At the completion of this programme it is hoped that vibration requirements will be established which will prevent the acceptance of helicopters having severe and objectionable vibrations. Designers and manufacturers must then of necessity give more attention to the reduction of vibration.

AMERICA'S OFFICIAL HISTORY

"The Army Air Forces in World War II," Volume One. Prepared by the Office of Air Force History, United States Air Force. Published by the University of Chicago Press, and in Britain by the Cambridge University Press. Price 27s 6d.

THIS first volume of the official history of the U.S.A.A.F. in World War II is sub-titled "Plans and Early Operations, January, 1939, to August, 1942." It also covers briefly in its early chapters the story of the Air Service in World War I and the Army Air Arm between wars, and is therefore a record of some 35 years of struggle; for when it was not fighting the Germans and Japs—and often while it was doing so—the Air Force had to fight for its existence in Washington against bitter inter-Service jealousy.

By mid-1941 American Service chiefs realized that to ensure the defeat of Germany it would be necessary for the United States to enter the war. Consequently, this History tells us, the Air Arm was allowed to plan the build-up of 84 groups, with a personnel strength of 400,000, to be achieved by June 30th, 1942. Unfortunately, although 70 of these groups had been activated by the time Japan struck at Pearl Harbour, "many were at cadre strength only and few had been equipped with suitable aircraft." Even worse, much of the best equipment was lost in the initial Japanese attacks against Pearl Harbour and Clark Field (described in tragic detail for the first time in Chapter VI).

The months after Pearl Harbour were marked by further setbacks in the Pacific, and Chapter VIII describes the frantic switching of all available aircraft to regions where new attacks were expected. The seriousness of the situation at that time is shown by the fact that the entire 1,200-mile length of the U.S. West Coast, along which many of the leading aircraft factories are situated, was protected by only 45 modern fighters and ten bombers!

In the remainder of the book we can read how air power was able gradually to stem the tide of defeat. Chapters X to XIV cover the campaign in the Dutch Indies, defence of Australia, the Coral Sea and Midway Battles, attack on the Aleutians, the Doolittle Tokyo raid, and battles in New Guinea and China, which marked the gradual halt of Japanese progress in the Pacific. The American counter-attacks which followed are to be dealt with in vols. IV and V of the History.

The last three chapters describe the slow build-up of the Eighth Air Force for the air assault on Europe, and the first mission by 12 B-17s on August 17th, 1942, against railway yards at Rouen. They tell a fine story, holding promise of an even greater story in vols. II and III, which will deal with the air war against Germany and Italy.

As far as this country is concerned, Chapter XV is probably the most important, for it deals with early participation by the U.S.A.A.F. in the Battle of the Atlantic. Because of a pre-war restriction—designed to placate the Navy—which prevented Army aircraft flying more than 100 miles from the shore line, "December, 1941, found those U.S.A.A.F. units best equipped for anti-submarine operations trained almost exclusively for bombardment." And the U.S. Navy admitted that it had "not a vessel available that an enemy submarine could not outdistance when operating on the surface," while "the guns of these vessels would be outranged by those of the submarine." All this in spite of the fact that recollection of the German submarine campaign in World War I was a chief factor in America's decision to join in the struggle, and that the U-boat menace in World War II was proving no less serious.

The story of difficulties experienced by the U.S.A.A.F. in building up its anti-submarine force, and of the great toll of Allied shipping taken by U-boats in 1942, should be read by all those who plan our defence to-day; for the submarine was never beaten in World War II, and remains the most potentially dangerous weapon in the world.

The Army Air Forces in World War II is outstanding both as a record of past actions and as a warning against future unpreparedness. Nowhere is there any "alone we did it" stuff, for the compilers make no attempt to gloss over the U.S.A.A.F.'s lack of experience at this time, or the mistakes made. Help given to the Service, particularly by the Royal Air Force, is generously acknowledged. J. W. R. T.

SALES OF R.A.F. SURPLUS STORES

FROM time to time readers make enquiries concerning sales of R.A.F. surplus material, and it may therefore be of interest to quote some facts on this subject recently elicited from the Ministry of Supply.

It is M.o.S. policy to dispose of as much as possible of the remaining surplus stores by auction sales at the sites on which they are stored. A dozen-odd such sales will take place during the next six months in accordance with a programme announced in the *Board of Trade Journal* (H.M.S.O., price 6d) and individual sales will be advertised locally, nationally and in trade journals.

The principal items sold are radio, electrical and photographic equipment, aircraft parts, tools, clothing and footwear. Catalogues obtainable from the appointed auctioneers provide the only lists of stores on offer.

One of the objects of using the auction method of disposal is to minimize clerical work; accordingly, no detailed records of stores for sale are maintained at M.o.S. headquarters. Nor is it possible for the Ministry to say where and when items already disposed of at a wholesale level will be available to the general public. The only enquiries that can normally be dealt with are: (a) those relating to complete aircraft or engines; (b) to light and other non-ferrous metals and their alloys; and (c) to large quantities of any individual item for export.

Enquiries concerning (a) should be made to the Assistant Director of Disposals (A), Ministry of Supply, Great Westminster House, Horseferry Road, London, S.W.1 (Victoria 3811); those about (b) to the Directorate of Non-ferrous Metals, Ministry of Supply, 66, Gower Street, London, W.C.1 (Museum 8044); and those concerning (c) to Home Disposals, Ministry of Supply, Great Westminster House, Horseferry Road, London, S.W.1 (Victoria 3811, ext. 342).

Finally, sparking plugs are disposed of by being handed back to the various manufacturers, and radio valves go to the British Radio Valve Manufacturers' Association.

GLIDING ON THE SCREEN

TOO many otherwise-good documentary films on specialized subjects are ruined by infantile commentaries. *Wings for Pauline*, which has gliding as its subject, has escaped this fate and, moreover, has achieved the distinction of a general release; it is at cinemas of the A.B.C. circuit this week (May 23rd-28th).

Times Film Productions and the director, Frank Chilton, deserve congratulations on a "short" which, while surely entertaining in the box-office sense, yet contrives to be technically above suspicion. The lovely windswept country round Bradwell Edge is the *locale*, and Miss Margaret Swale and other members and officials of the Derbyshire and Lancashire Club enact the slender little story which serves as a framework for some entrancing pictures of various types of sailplanes—always photogenic subjects—in their element.

Wings for Pauline should bring more than a few recruits to the gliding movement.

CORRESPONDENCE

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

THE LATE COL. SMITH-BARRY

A Memorial Suggested

THIS letter is not intended as a eulogy of the late Col. Smith-Barry's undeniable talents, for I never knew the Colonel personally. His contribution to practical flying training, in the early stages of this "art," and at a time of great national need, was very considerable. In view of these services, I feel (and perhaps others join me) that the record of his name, and his "likeness," should be preserved in a place where all those engaged in the furtherance of flying technique would be reminded frequently of the sound foundations which this gallant and clear-sighted officer laid so successfully.

If, in fact, something of a similar nature is not already in view, my suggestion is that a portrait of the late Colonel might be painted from old photographs, etc., and presented by his admirers to the Empire Central Flying School, to hang, with others, in their own particular "Hall of Fame," at this great centre of flying training.

My fear is that the passage of time is apt to obliterate such names, especially as the holders of so many of them are extremely modest men, laying no claims to any outstanding achievements.

A. P. C. HANNAY,
(Lt. Col., Cameron Highlanders, and R.A.F., Retd.).
Bowden, Roxburghshire.

"KITE-SITTING"

And a Graceful Means of Descent

WATCHING some enthusiasts flying kites, I found myself wondering about the possibilities of designing such things to carry a passenger. If this is feasible, one can visualize kite-sitting as quite a pleasant pastime, not to be compared to gliding no doubt, but coming within the reach of a larger number of people, since it should be far less exacting as regards the choice of site.

A passenger kite would probably have to be constructed to be capable of being flown and controlled like a glider, so that if the wind dropped suddenly there should be no need to rely on the man on the winch, the cable being releasable to make a free landing.

No doubt this problem has already been thought about, and it would be interesting to hear what conclusions (if any) have been reached.

R. HADEKEL.
London, S.W.7.

[In 1894 Lawrence Hargrave, an Australian, was lifted by four kites attached to a single cable, and S. F. Cody later made successful experiments with man-lifting kites in this country. ED.]

VETERANS

Some Further Notes on the Historical Aircraft at the R.Ae.S. Garden Party

I HAVE read with interest the notice (in your issue of May 12th) of the performance of the veteran machines displayed at the Royal Aeronautical Society's Garden Party on May 8th, and I think that most of those present enjoyed seeing them in the air again.

It might be of interest to many of your readers if I were to amplify some details, and, if you will not consider me too pernickety, to correct some small errors in your description of these veterans.

The Bleriot is No. 14 of a batch of Type XI aeroplanes laid down by Bleriot in 1909, immediately after his historic cross-Channel flight, and was found by the late Mr. R. O. Shuttleworth in 1936, after 25 years "hibernation" in a garage loft. As it was the intention to fly it after rebuilding, prudence dictated that the fabric, the tyres, and many of the wooden structural members should be replaced. Other than this, the aeroplane embodies most of the original components, and would, I am sure, deprecate being termed a replica. The castering and self-centring undercarriage is quite original and has not been modified in any way. It will be noted that a sprung tailwheel was fitted as long ago as 1909.

The Deperdussin, type 143, was designed in 1910, and the particular aeroplane shown at the Display was made in the spring of 1911. It was flown in that year by both Brock and Ewen, two of the early pioneer aviators. The latter made the first crossing of the Firth of Forth in September, 1911, in a similar Deperdussin.

I agree with your report that the pilots of both the Bleriot and the Dep. put up a very good show indeed in the circumstances obtaining at White Waltham, particularly as they had not even taxied the machines prior to the display.

If I might close on a note of appeal, I am at present rebuilding an aeroplane fitted with a 50 h.p. Gnome engine, and if by any chance any of your readers are in possession of one of these engines, or spare parts thereof, I would be grateful if they would get in touch with me at the address given below.

L. A. JACKSON,
The Warden Aviation Co.
Old Warden Aerodrome,
Biggleswade, Beds.

THE ASYMPTOTIC BOMBER

Some Comments on an Article "of Outstanding Interest Technically"

From Cdr. (E.) Peter du Cane, O.B.E., M.I.N.A., F.R.Ae.S., F.R.S.A.

THE article in your May 12th issue on "The Asymptotic Bomber" is of outstanding interest technically, and perhaps politically in its widest sense. One can imagine the Russian planners being perhaps even more interested, as the opinions expressed appear vitally opposed to what those of us who think of these things have been led to suppose will be the method of laying the atomic egg, if or when this becomes necessary.

I have been intimately involved over the last fifteen years in the design and development of a weapon involving a number of the technical problems which have also to be solved in the course of producing and designing aircraft. The problems in our case, admittedly, are not so acute, but to produce the right result they call for the same all-round judgment on the part of those concerned in formulating their requirements, as well as in those whose duty it is to meet these requirements to the best of their ability.

Now, at first sight one would say that this is all quite straightforward. Those who do the fighting, or are likely to do it, will formulate the requirements and the technical staffs of the ministries concerned will translate those requirements into a usable article.

It is just because this Utopian theory never works out in practice that the state of affairs envisaged by "Favonius" crops up time and time again, and usually, on the whole, rightly. The Powers that Be can seldom afford to wait for the best possible.

There has never to my knowledge been a successful aircraft or boat that was not criticized at some stage. I can well remember an S.B.A.C. show at Hatfield in about 1937 when the Spitfire was shown rather as an afterthought. More than one R.A.F. pilot of Fighter Command at the time shook his head and inferred that the process of landing would be too difficult for the average pilot in realistic conditions.

If, however, we carry out the logical sequence described above, no one wicked firm or individual will be able to scoop the pool by persuading the Powers that Be that it or he alone has the goods.

It will be necessary to make an estimate of the fighters likely to be in operational use at the time the bomber under consideration is carrying out its attack, and design accordingly. After certain preliminary calculations it will probably be found that no power unit exists which can do the job, so that more time must be spent in development and experimentation with promising power plants, overlooking no reasonable candidate, especially one with political or publicity "pull." In short, no bomber will be produced in this way for many years.

Is not the problem facing the U.S. authorities to have something reasonably ready to make a good shot at laying the "eggs" within the next few months, because it may easily become necessary in that short time?

Granted, there is probably a lot of high-pressure salesmanship knocking about, together with quite a deal of the usual "bull," but it is amazing how an aircraft can be improved provided it starts right. The man with the courage of his convictions who has the power in his own hands to initiate such a programme will have listened to a number of men who know what is wanted but who have not the power or the money to give our friend the O.K. to go right ahead. This can come in democratic countries only from the result of committees upon which the types who really know are more than likely to be

opposed by considerations ranging from financial (the most likely) to purely personal (by no means as unlikely as might be thought). It is for this reason that the much-abused system of private enterprise will continue to serve civilization well, even though those who stake all will have to go through a period of critical attack on all sides, and be patient as well as philosophical.

It must be admitted that the co-operation of the Government research establishments is vital if the technical merit of the resulting design is to reach the required standard of a world-beater. Luckily, however, the principals of the research establishments are individuals and not committees. I feel that we in this country are prone to be too critical of the individual effort in its widest sense, which includes an individual as represented by a firm.

My guess is that, despite the possible shortcomings of the B-36 suggested by "Favonius," thirty of these aircraft would reach the target of any known enemy, provided there were no limitations upon their use and the tactical details of their attack were worked out by the best available brains. The fact that I am unconnected with the aircraft industry, though having many good friends in it, must be forgiven, but it will indicate impartiality. It is also to be understood that I do not presume to challenge in any way the remarks of "Favonius" on the subject of the relative merits of the fighters as recently developed by the various countries. Here the situation is obviously fundamentally different, as Great Britain must be presumed to have immense advantages over others by virtue of her lead in the sphere of jet units.

Where specific consumption is of importance one is not quite so sure, at least from what one knows of the developments which have reached the surface and which may, therefore, be considered usable in the military sense in the next two years.

Hambledon, Hants. PETER DU CANE.

"GAS TURBINES AND JET PROPULSION"

An Appreciation from Chile of a "Flight" Book

I HAVE had the pleasure of reading the book *Gas Turbines and Jet Propulsion for Aircraft*, by G. Geoffrey Smith, a copy of which I had the good fortune to obtain in Paris shortly after completing my studies at the Higher Aerotechnical College at Madrid. The interest engendered by reading the book has been such that, in my present position as head of the aeronautical engineering courses at the Military Aviation School in my country (Chile), I decided to adopt it as a text book, in order to provide a descriptive foundation for the lectures on the subject. As the work of the translator of our school, Sr. Luis Naranjo, has just been completed, I have started on the technical revision of the translation.

I can add little, if anything, to the eulogistic and authoritative words of Sir Geoffrey de Havilland, except to express my modest congratulations on the importance of the work, which reveals the magnitude of your effort to pass such invaluable information on to the specialists in aeronautical engineering.

Santiago de Chile. HUGO FUENTES FUENTES,
Flight Captain,
Aeronautical Engineer, A.S.A.M.

THOSE FRENCH STEAKS

A Reminder to Continental Air Rally Participants

TO visit the Paris Salon is one thing and to buy freely the finest fillet steak off the ration is another joy for an Englishman. But please let me give a word of warning.

I arrived at Lympne with a kilo of succulent steak, only to learn that I could not bring it into this country owing to the restrictions on French *uncooked* meat. I was mortified to see the steak destined for destruction in case it carried foot-and-mouth disease.

So if any readers visiting France think of bringing back meat let it be cooked or cured.

Cosby, Leicester. JACK RICE.

RUSSIA'S AIRCRAFT INDUSTRY

Doubt About "Liquidations"

THE very interesting article in *Flight* of May 12th concerning the aircraft industry of the U.S.S.R., has prompted me to write, at the possible risk of being considered by some readers as a "fellow traveller"—which I am not, although I did once buy a copy of the *Daily Worker* in a weak moment.

That the Russian aircraft industry is inferior to the British and United States industries seems certain, but surely this is not surprising considering the limited extent of engineering in Russia before 1917.

A number of men mentioned in the article are stated to have been arrested or "liquidated," in keeping with a practice which certainly goes on to a large extent in the U.S.S.R., but I cannot help remembering that in 1938 or '39 one of the leading Russian aeronautical engineers, A. Toupolev, was reported to have been "liquidated" as an "enemy of the people"—which did not, so it seems from later reports, prevent him from designing the T.B.-7 and T.U.-2 bombers, and copying the design of the Boeing Superfortress.

To end with may I make the comment that the Russian aircraft industry is certainly not as good as the U.S.S.R. claims, but perhaps it is not as bad as we sometimes like to think?

Coventry. N. HEAP.

BRITAIN'S AERONAUTICAL HISTORY

Basic Types and "Mods"

I READ with interest Mr. John O. Isaacs' letter (May 5th) regarding a history of Britain's aeronautical achievements, but feel that the task he describes would be a great deal bigger than he imagines.

Surely, in a *complete* history all modifications, etc., to basic types should be included, whereas he himself suggests a list of 1,300 *basic* types. These basic types are the ones that most collectors and enthusiasts have most information about, and their craving is for knowledge of the "not-so-basic," which, I agree, is extremely difficult in many cases to obtain.

I do most wholeheartedly support the suggestion that something is required to help keep alive the past. I have been going pretty deeply into British aircraft history for the past ten years, but each week I merely realize how much more there still is to find! P. H. T. GREEN.

Grimsby, Lincs.

FORTHCOMING EVENTS

May 26th and 27th.—National Physical Laboratory: "Open Days" May 26th for representatives of industrial organizations and May 27th for members of university staffs and government departments.
May 28th.—Wolverhampton Aero Club: Air Display and Goodyear Trophy Race.
May 29th.—Leicestershire Aero Club: Air Day and "At Home," Ratcliffe airfield.
May 29th.—R.A.F. "At Home" at Shoreham Airport.
June 1st.—R.Ae.S. (Luton): Discussion evening.
June 1st.—R.Ae.S. (Weybridge): Annual General Meeting.
June 4th to 6th.—Bembridge and Sandown Aero Club: Flying Week-end.
June 4th-6th.—Aero Club d'Epernay: Third International Air Rally. (Private invitations.)
June 11th.—Royal Naval Air Station, H.M.S. "Gamecock": King's Birthday Review and Navy Day, Bramcote airfield, Nuneaton, Warwickshire.
June 11th and 12th.—Royal Air Forces Association: Annual Conference, Margate.
June 11th to 17th.—R.A.F. Small Arms Association: The 23rd Annual Championship Meeting.
June 11th.—Darlington and District Aero Club: Air Display, Croft airfield.
June 11th to 13th.—Yorkshire Aeroplane Club: International and Club Invitation Rally.
June 12th to 19th.—Italian International Air Week, Rimini and Venice.
June 16th to July 2nd.—Royal Tournament, Olympia.
June 18th.—R.Ae.S. (Brough): Flying meeting and Cirrus Trophy race, Brough.
June 18th.—Parachute Regimental Association: Old Comrades' Day, Aldershot.
June 18th and 19th.—Aero Club de Basse Normandie: Fiers de l'Orne Rally.
June 19th.—Air League of the British Empire (Portsmouth): Garden Party, The Airport, Portsmouth.
June 19th.—Cowes Aero Club: Air Display.
June 22nd to 24th.—Institute of Transport: Congress at Buxton.
June 26th.—Northern Heights Model Flying Club: Gala Day, Hawker airfield, Langley, Bucks.
June 26th to July 3rd.—Aero Club d'Italia: International Air Week, Milan.
July 1st.—R.A.F. Golfing Society: Summer Meeting at Moor Park Club, Herts.
July 2nd.—R.N. Air Station, Lossiemouth: "Open Day" and Flying Display.
July 2nd to 4th.—Royal Aero Club: Private air rally at Deauville. Guests of M. André.
July 2nd to 10th.—Tour de France Aérien.
July 4th to 11th.—Royal Aero Club: Private Air rally to Spain.
July 9th.—Redhill Flying Club: Garden Party.
July 16th and 17th.—Royal Aero Club: Private air rally at La Baule, St. Nazaire. Guests of Mme. André.
July 17th.—Cowes Aero Club: Air Display.
July 23rd.—"Daily Express" Air Pageant, Gatwick Airport.
July 30th to Aug. 1st.—King's Cup Race and National Air Races, Elmdon Airport, Birmingham.
Aug. 6th.—Southend Flying School: Flying Meeting and Air Display.
Aug. 19th to 26th.—British Gliding Association: National Gliding Competitions, St. Hucklow, Derbyshire.
Aug. 21st.—Wiltshire Flying Club and Royal Artillery Flying Club: Thruxton Air Races.
Aug. 28th.—Cowes Aero Club: Air Display.
Sept. 6th to 8th.—R.A.F. Golfing Society: Autumn Meeting and Ladies section Championship at Walton Heath Golf Club.
Sept. 7th to 11th.—S.B.A.C. Annual Flying Display and Exhibiton, Farnborough.
Sept. 7th.—R.Ae.S. (Luton): "Air Liner Operation."
Sept. 11th.—Gordon Bennett balloon races, Brussels.

Royal Air Force and Naval Aviation News and Announcements

SERVICE AVIATION

SOURCE OF SUPPLY: Conversion of Wellington T.10s for crew training is one of the activities of Boulton Paul Aircraft, Ltd. Three of these Vickers veterans are seen on the tarmac while a Merlin-engined Balliol 2 advanced trainer passes overhead. Details of work on the pre-production order for 17 Balliol 2s are discussed in this issue.

"Ariel" Success

EVIDENTLY the Chief of the Air Staff was delighted by the work of conference *Ariel*, to which reference was made on these pages last week. He told correspondents, after this discussion of manpower had ended, that the name might more fittingly have been *Prospero*, for a magic wand had been waved and very remarkable results had been forthcoming. It now remained to examine without delay the numerous proposals advanced. The conference had made it clear that the R.A.F. was confronted not so much by a recruiting problem as with the necessity of making the best use of manpower. The Service did not necessarily want all the cream of the country's manhood, but the right men in the right places. It was suffering not so much from the aftermath of war as from the "aftermath of post-war," by which the C.A.S. meant that unattractive descriptions of Service life, circulated during the run-down period, had exercised an unfortunate influence, which was only now being dispelled.

It was amazing, observed Lord Tedder, how the R.A.F. managed to keep going during the run-down; any industrial concern, he thought, would have shut up shop. Again he emphasized that the Service needed volunteers, for only volunteers with long service could do some of the jobs which had to be done. Nevertheless, he said in answer to a question that he thought there would always be a place for the National Service man.

The closing session of the conference was attended by the Prime Minister, Defence Minister and other members of the Cabinet.

New N.S. Scheme in Action

PILOT training has now begun at Wittering, Northants, of the first 52 National Service airmen to be accepted as aircrew for their period of conscription. They joined under the scheme which began on the day of their registration—December 4th last year—by which 300 National Servicemen will receive limited pilot training during their 18 months' service, and qualify for a "modified" flying badge. One hundred of the 300 vacancies are reserved for proficient A.T.C. cadets.

TAKING COUNSEL: In holding conference "Ariel" last week, the Chief of the Air Staff, Lord Tedder, created a precedent by receiving some 200 civilian delegates. He is seen in discussion with Mr. Russell Vick, K.C. (right), the chairman of the General Council of the Law Society.

Repeat . . . Signals

IN the caption beneath an official picture (published in *Flight* of May 12th) of the party which toured the Far East in the Lancaster *Iris* for an inspection of radio servises, A.V-M. E. B. Addison, C.B., C.B.E., was described as "Director-General of Services (Staff)." As most Service readers will have guessed this should, of course, have read "Director-General of Signals."

Culham Naval Air Day

ON Saturday, July 9th, H.M.S. *Hornbill*, more widely known as Royal Naval Air Station, Culham, is staging a Naval air display and is expecting a gate of 20,000. One of the events will be exhibitions by No. 1832 R.N.V.R. (Air) Squadron, part of the London Division of the V.R., which is resident at Culham. The Squadron, hard at work recruiting ratings, hopes that the display will attract men to all branches of its ground organization; nearly 200 are required and already 50 have responded.

July 9th marks the beginning of 1832's summer training which will include ten days at sea in H.M.S. *Implacable*. Formed in July, 1947, the Squadron has logged more than 5,000 flying hours.

Singapore Sight-Seeing

AT R.A.F. Station Changi, Singapore, the education authorities have arranged visits for airmen and airwomen to several spots of local interest. On the island recently, there were tours of a large rubber estate and factory, the

Service Aviation . . . . .

Singapore Law Courts, the offices of the *Straits Times*, and a pineapple-canning factory, where free samples were provided by the owner. Waiting-lists for the visits are reported.

Bomber Command Marksmen Meet

AT the Bomber Command Rifle Meeting, held at Beckenham Range on May 13th, the inter-station cup was won by Conningsby with a score of 989. Mildenhall was second, with 972.

Auxiliary Enterprise

AS part of its drive for ground crew, No. 600 (City of London) Squadron, R.Aux.A.F., is displaying its own recruiting poster, drawn by David Langdon, in various parts of the capital. It depicts a six-armed "erk" struggling to service a Spitfire and appealing for assistance.

Atlantic Pact Jet-Training

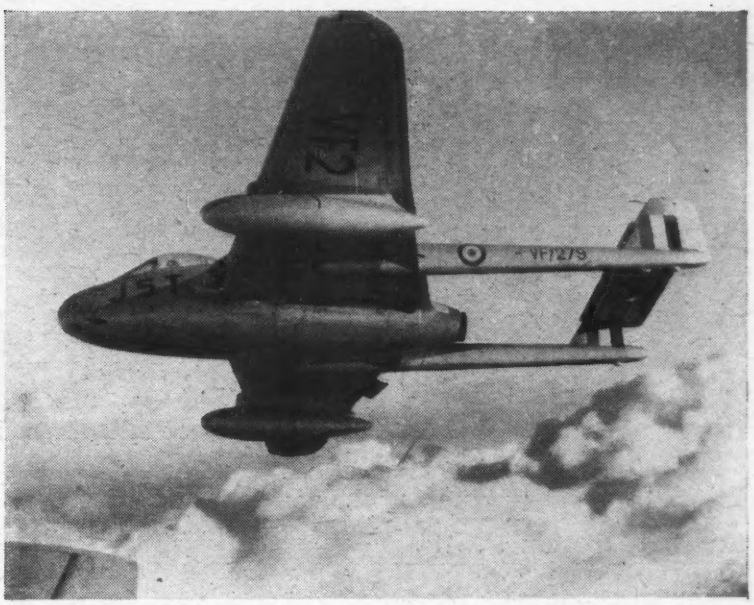
REPRESENTATIVES of the Danish Government are discussing plans with the Air Ministry for jet-conversion training of Danish pilots in Britain. Denmark, one of the signatories of the Atlantic Pact, has ordered 50 Gloster Meteor 4s, the first of which will be delivered in August.

Catalina Crash Awards

FOR their gallantry and initiative in rescuing one of the crew of a Catalina which crashed at Lord Howe Island, New South Wales, last September, two former members of the Royal Australian Air Force have received awards: Mr. R. L. Wilson, proprietor of a guest house on the island, has been awarded the George Medal, and Mr. W. E. Davis the B.E.M.

Service Cyclists at Herne Hill

CHAMPION cyclists of the R.A.F. and R.A.F. Association will compete in events at a Herne Hill Cycle Track meeting on Saturday, May 28th. The track will be taken over for the occasion by the R.A.F.A., in conjunction with the National Cyclists' Union and the Air Ministry. Principal event will be a 4,000-metres pursuit race between R.A.F. and R.A.F.A. teams for a cup presented by the Association. A B.B.C. commentator, Brian Johnston, will broadcast his reactions while riding a penny-farthing, and members of the Handlebar Club will be present.



"Flight" photograph.

BREAKAWAY: A D. H. Vampire of No. 3 Sqn., with flaps lowered to reduce speed, parts company with the photographic Harvard over Germany. The Vampire 1 is being superseded in the R.A.F. by the Mk. 5 fighter-bomber variant.

Infinite Odds

DURING March, passenger- and troop-carrying aircraft of the R.A.F. flew 5,100,000 passenger-miles on scheduled services, airline special flights, and trooping. There were no accidents involving death or injury.

Marshals Meet

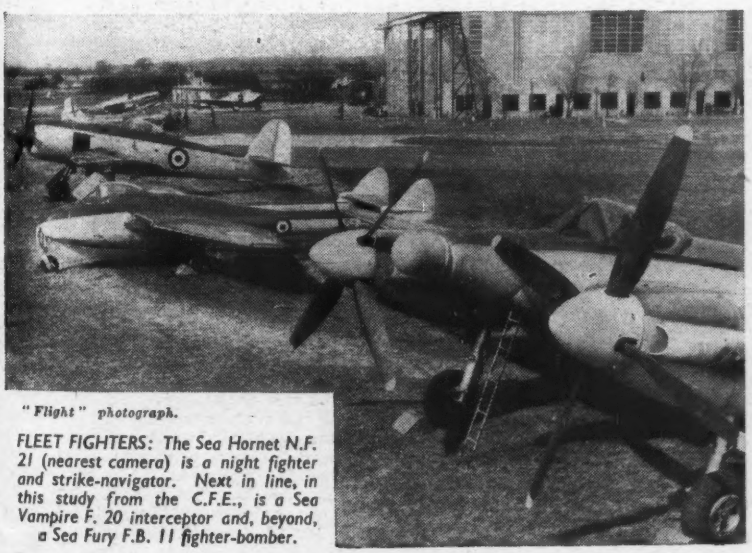
MEMBERS of the Air Marshals' Club met for luncheon at the Connaught Rooms, London, on Friday, May 13th. Marshal of the Royal Air Force Lord Tedder, Chief of the Air Staff, presided. Among those attending were Marshals of the R.A.F. Viscount Trenchard, Sir John Salmond and Sir Edward Ellington, and the Commanders-in-Chief of all home and overseas commands. Also present were the Chiefs of Air Staff of the R.C.A.F. and R.A.A.F., and 83 other members of the Club.

Canadian Cold-Weather Trials

THE Commanding Officer of the R.C.A.F. Winter Experimental Establishment, W/C. A. D. Cameron, stated last week that problems of operating aircraft at temperatures down to 30 deg below zero have been solved. Jointly operated by the R.A.F., R.C.A.F., R.C.N. and the Ministry of Supply, the establishment recently concluded its third successive winter of cold-weather testing with a week of conferences. It is reported that during the trials greatly improved results with piston engines were achieved, particularly in starting, although generally turbojets continued to give less trouble. The Meteor and Vampire are regarded by the Establishment as the most efficient cold-weather fighters in the world.

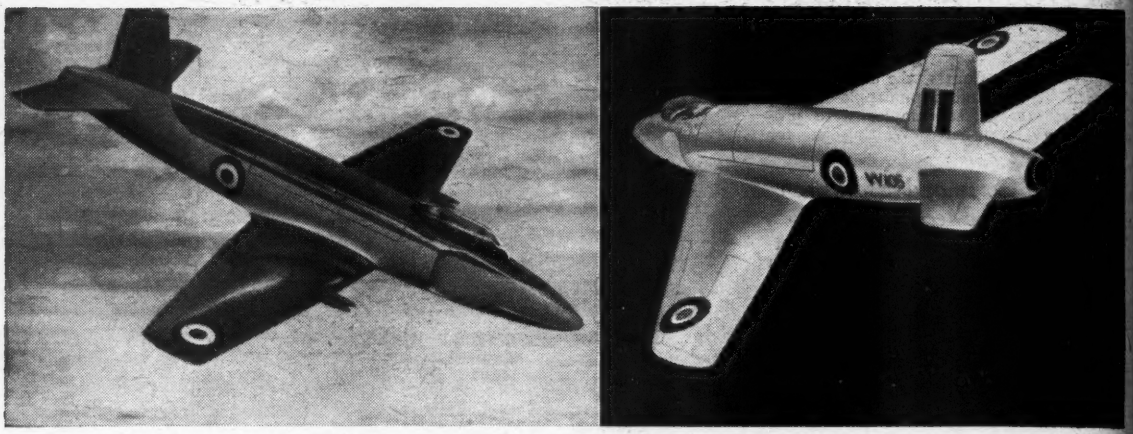
Faster-Braking Meteor

EMPLOYMENT of the latest twin-bag Dunlop brakes gives the Meteor 4 a considerably decreased ground run on landing, and consequently in the landing run from the hypothetical 50ft screen. Typical figures to illustrate the decrease show that, in a temperature of 15 deg C, the former hard-runway ground-run of a Meteor with full internal fuel tanks has been shortened from 1,725ft to 1,437ft. From 50ft, under similar conditions, a



"Flight" photograph.

FLEET FIGHTERS: The Sea Hornet N.F. 21 (nearest camera) is a night fighter and strike-navigator. Next in line, in this study from the C.F.E., is a Sea Vampire F. 20 interceptor and, beyond, a Sea Fury F.B. 11 fighter-bomber.



PREVIEW IN MINIATURE: Two Vickers-Supermarine models, recently exhibited at Paris, show the major exterior differences between the production version of the Attacker (left) and its experimental successor, the 510.

Service Aviation . . . . .

landing run of 2,537ft becomes possible, compared with the previous distance of 2,825ft.

R.A.F. Appointment

A SIGNALS specialist, A. Cdre. G. H. Randle, has been appointed Deputy Director of Communications Development at the Ministry of Supply. He has served for the past twelve months as Senior Technical Officer at Fighter Command H.Q., and was previously a Deputy Director of Radio at the Air Ministry.

R.A.F. Permanent Commissions

THE following officers have been selected for permanent commissions in the Royal Air Force, in the branches shown:

GENERAL DUTIES BRANCH.
Squadron Leader: M. H. James, A.F.C.
Flight Lieutenants: W. E. Barfoot, J. A. Cline, A. E. E. Cole, J. Davis, A.F.C., W. T. H. Fleckney, D.F.C., J. T. Hodges, A. G. L. Huggins, A. K. Marshall, A.F.C., G. K. Muirhead, D.F.M., D. R. Oliver, D.F.C., W. F. Young.
Flying Officers: R. R. Austin, W. M. Drake.

TECHNICAL BRANCH.
Flight Lieutenants: G. T. Cherry, L. W. J. Cousins, A. T. Griffiths, A. G. W. Williams.

EQUIPMENT BRANCH.
Flight Lieutenants: D. R. Lewis, W. J.MacConnachie, B. H. Miles, R. O. Snape.
Flying Officers: S. A. Armstrong, T. P. M. Hawes, J. H. G. Yardley.

SECRETARIAL BRANCH.
Squadron Leader: A. G. R. Green.

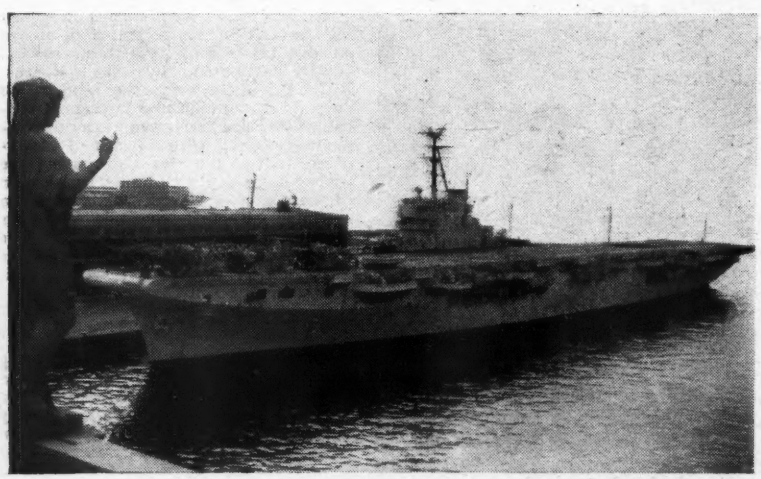
AIRCRAFT CONTROL BRANCH.
Flight Lieutenants: H. W. Port, D. A. Simes.

EDUCATION BRANCH.
Flight Lieutenants: T. E. W. Evans, J. A. Tinline.

PHYSICAL FITNESS BRANCH.
Flying Officer: L. W. Brown.

Reservists' Record

NO. 1 Reserve Flying School of the R.A.F.V.R., which is based at Panshanger, Herts, now has 364 pilots, 69 navigators and 41 signallers on its strength. Its previous record of 1,220 hours in a month, set up twelve months ago, was beaten last month by more than 164 hours. To ensure that flying gets away to a good start, some of the London reservists are met by a 23-seat coach in London early on Sunday.



"OCEAN" AT REST: A scene from the harbour at Trieste during a recent visit by H.M.S. "Ocean." Initial deck trials of the Sea Vampire were made in this 14,000-ton light fleet carrier.

Reunion

ALL ranks, R.A.F. and W.R.A.F., interested in a reunion of 25 Group H.Q. Staff (Buntingsdale and Comm. Flight) are asked to inform F/L. S. Vaughan, 30, Dingwall Road, Croydon. If response is adequate, details will be announced later.

Royal Naval Flying Club

AFTER some years of wartime and post-war inactivity, the Royal Naval Flying Club is now being revived. Up to 1939 the Club had no property or premises of its own and members enjoyed affiliated membership of a number of clubs located near Naval bases. In its new form, however, the Club possesses two Tipsies, the gift of the Fairey Aviation Company, and by arrangement with the Board of Admiralty is temporarily established at the Royal Naval Air Station, Gosport, Hants.

Membership is open to serving and retired officers of the Royal Navy and Reserves, Royal Marines and Commonwealth Navies. Subscription rates are £2 2s per annum for members living in the United Kingdom and 10s 6d per annum for those living or serving overseas. There is an entrance fee of £1. The stated objects of the Club are to provide economical private flying for officers of the Navy and Naval Reserves who are already qualified pilots and to train others to "A" licence standard. It is also intended to be a social meeting place where members may bring their wives and friends into the atmosphere of club aviation.

A Club building, in pleasant surroundings at Gosport, is now being made ready for the opening date, which is expected to be early in June. Mr. Kenneth W. Birt, formerly with the Wiltshire Flying Club, has been appointed chief flying instructor. Flying rates have been provisionally fixed at £3 dual and £2 5s solo per hour.

In due course it is hoped to increase the size of the aircraft fleet, and to open branches at places where there is a sufficient demand, particularly in the London area. Application forms for membership may be obtained from the Hon. Secretary, Royal Naval Flying Club, R.N.A.S., Gosport, Hants.